AMERICAN GAS JOURNAL

OCTOBER, 1937

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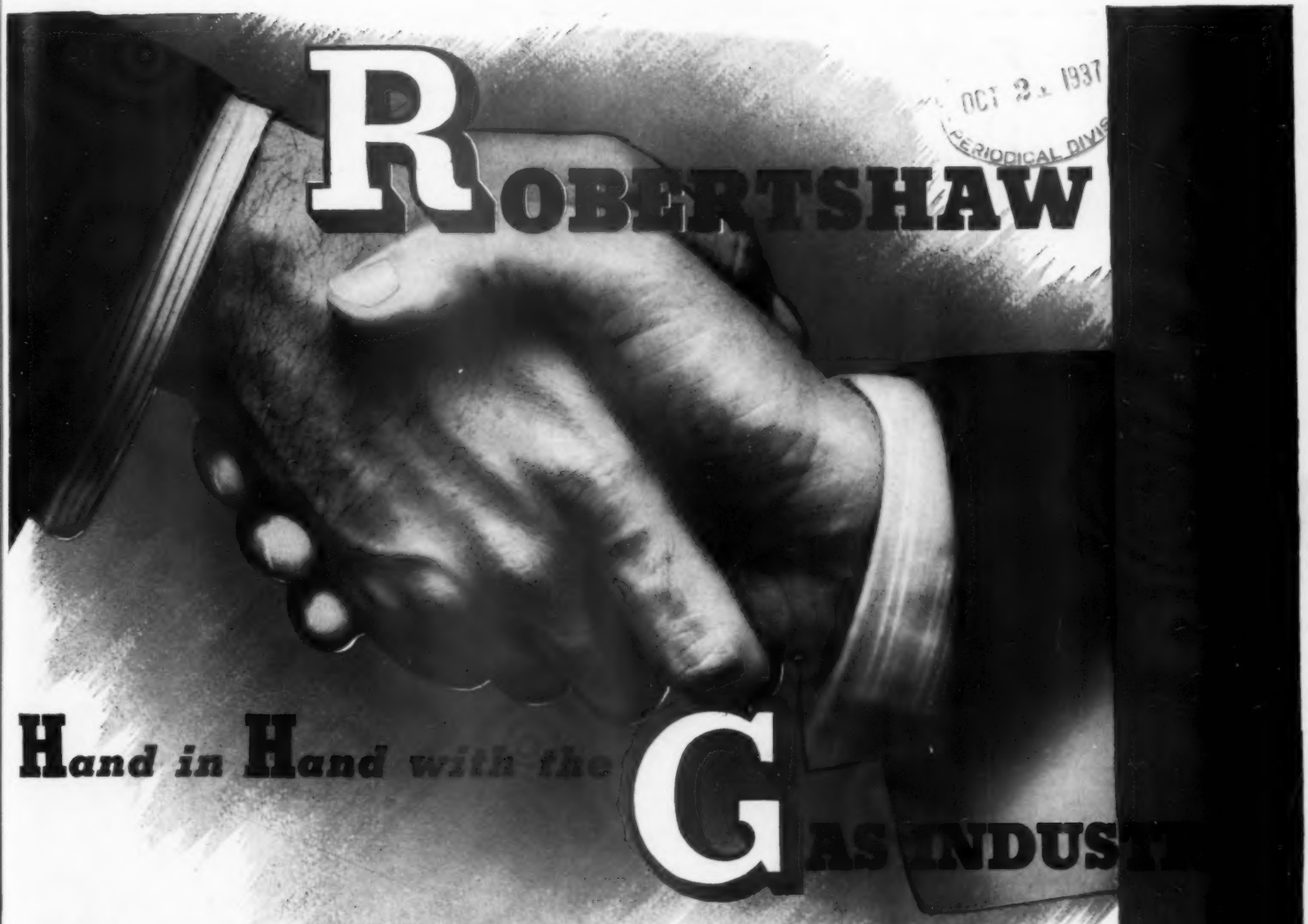


ROBERTSHAW

Hand in Hand with the GAS INDUSTRY

Nowhere is the inspiring phrase of "United we Stand" more fully typified than in the Gas Industry.

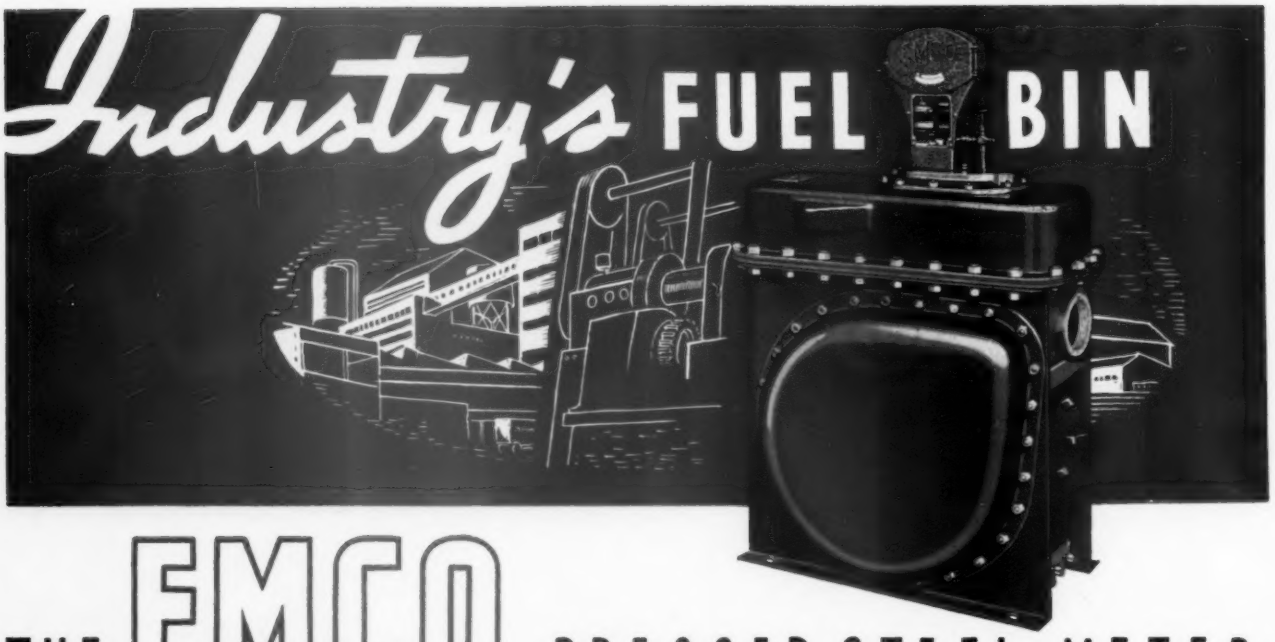
Its members stride forward shoulder to shoulder—always contributing to the common welfare—constantly pulling towards the goal of perfection—constantly developing a greater industry.

In the field of appliance-accessories Robertshaw has played its part. Long experience, finely equipped laboratories, unceasing effort—all are at the service of the industry, contributing toward perfection in automatic heat regulation for cooking, heating and industrial equipment.

The Robertshaw Thermostat Company salutes the members of the Gas Industry and pledges its continued endeavor to match accomplishment with accomplishment in the drive towards the common goal.

ROBERTSHAW THERMOSTAT COMPANY • Youngwood, Pa.

Industry's FUEL BIN

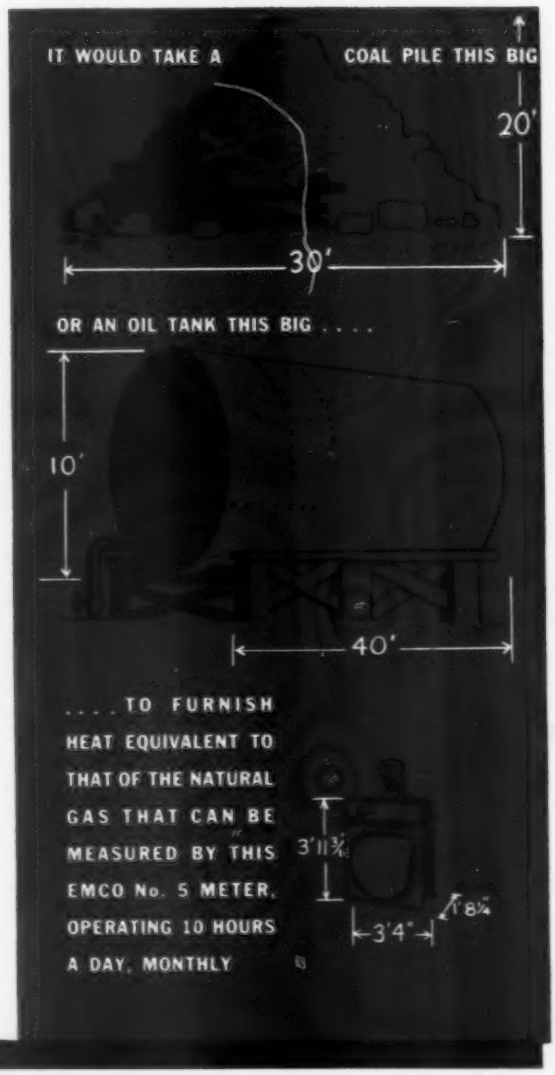


THE EMCO PRESSED STEEL METER

Of industry's three most widely used types of fuel, gas, coal and oil, gas alone offers unique savings in addition to its inherent operating advantages and efficiencies. In the case of storage, no valuable space is occupied, there are no annoying fire hazard requirements and no increased insurance premiums. In handling, gas is available at the turn of a valve. No expensive stoking or firing equipment, heating equipment or mixing valves are required. Also, the investment in stored fuel is eliminated, working capital is not tied up and payments are made after use, based on definite accounting periods.

This simple easy system of fuel supply is dependent upon metering equipment developed for this service itself. EMCO Meters, developed specifically for industrial services, provide the necessary accuracy, ruggedness and simplicity. They have progressed hand in hand with the growth of industrial gas consumption.

Reprints of this advertisement available to Industrial Sales Departments of Gas Companies upon request.


IT WOULD TAKE A
COAL PILE THIS BIG
20'
30'
OR AN OIL TANK THIS BIG . . . .
10'
40'
. . . . TO FURNISH HEAT EQUIVALENT TO THAT OF THE NATURAL GAS THAT CAN BE MEASURED BY THIS EMCO No. 5 METER, OPERATING 10 HOURS A DAY, MONTHLY
3'11¾"
8¼"
3'4"

PITTSBURGH EQUITABLE METER CO.

MERCO NORDSTROM VALVE CO.

MAIN OFFICES PITTSBURGH, PA.

NEW YORK	LOS ANGELES	TULSA	HOUSTON	MEMPHIS	BUFFALO
COLUMBIA	KANSAS CITY	CHICAGO	PHILADELPHIA	ATLANTA	OAKLAND

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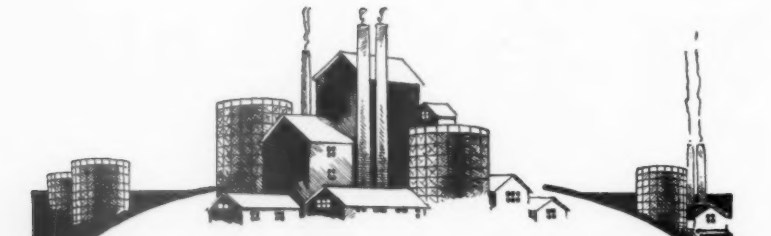
"AND ALL THEY USE IS A WRENCH—WHEN IT'S A DRESSER-COUPLED LINE"

Complicated and expensive jointing equipment is neither seen nor heard—along a Dresser-coupled line! The cost of such apparatus—and the expense of its operation, maintenance, and transportation—is saved. All that's needed is one tool—a simple wrench—to tighten the bolts . . . enabling unskilled labor to make *permanently tight* joints in minimum time.

NOTE TO READER

This is the eighth in a series of advertisements dramatizing one engineer's experience with his first Dresser-coupled line. For the complete story, write for Bulletin 351.

S. R. **DRESSER**
MANUFACTURING CO., BRADFORD, PA.
In Canada: Dresser Mfg. Company, Ltd., 60 Front Street, West, Toronto, Ont.



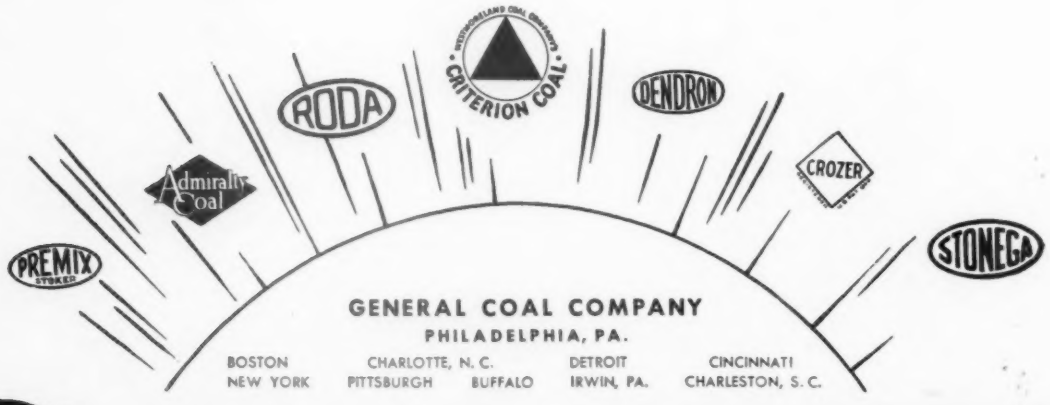
A General Coal Message of Specific Import Concerning Gas and Coke

The coals named below vary in properties so as to cover a broad field of requirements.

The location of the various mines provide competitive freight rates to many destinations. Ample tidewater loading facilities are available.

An opportunity to study your situation will quickly determine the suitability of these coals —and without expense to you.

In addition to these coals Roda and Stonega Coke (bee-hive) may show excellent economy in your Water Gas Operation.



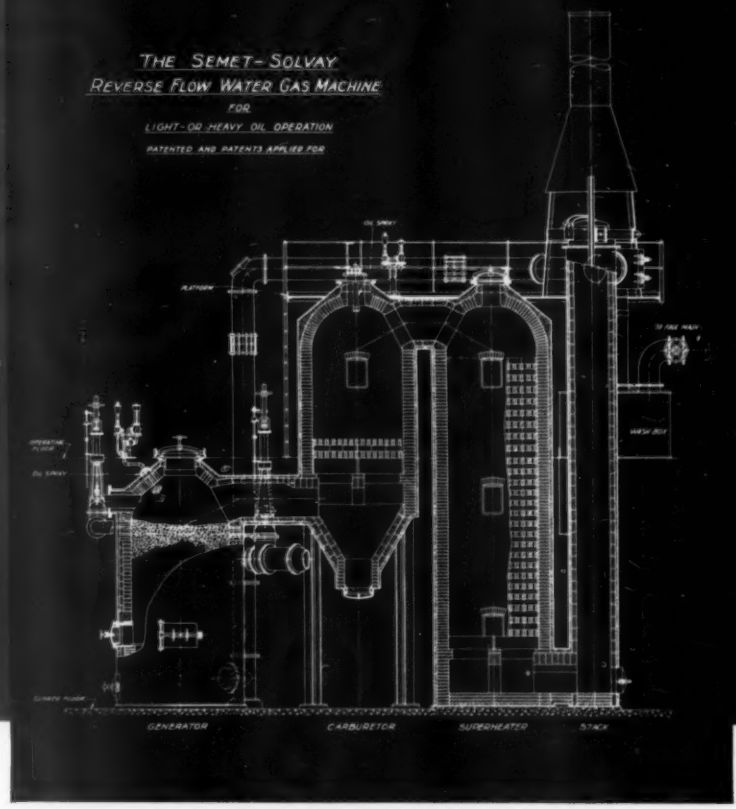
GENERAL COAL COMPANY
PHILADELPHIA, PA.

BOSTON NEW YORK CHARLOTTE, N. C. PITTSBURGH BUFFALO DETROIT IRWIN, PA. CINCINNATI CHARLESTON, S. C.

GENERAL COAL COMPANY

GENERAL COAL

REVERSE FLO WINS



Gas INDUSTRY RECOGNITION

Three more contracts have been awarded Semet-Solvay Engineering Corporation for Reverse Flow carbureted water gas machines.

- An 8' machine in Massachusetts is to be rebuilt for Reverse Flow and heavy oil operation.
- A new 8' Reverse Flow machine is to be built in Wisconsin for using regular gas oil.
- A new 12' Reverse Flow machine is to be built in Illinois to supply high B.t.u. gas for peak loads or gas around 500 B.t.u. as required.

At Springfield, Mass., where the first Reverse Flow installation was made, extremely interesting results are being obtained. Figures on output, generator fuel and oil per MCF and temperature uniformity throughout the set are available to operators. These data tell their own story of the superiority of the process.

The Reverse Flow Process is offered to the gas industry on the basis of its ability to reduce the holder cost of gas. We are confident that it will, in a reasonably short time, become the standard method of water gas making. We invite an opportunity to calculate its importance to your plant.

SEMET-SOLVAY ENGINEERING CORP. WE SELL SOLUTIONS TO HARD PROBLEMS NEW YORK

SEMET-SOLVAY
ENGINEERING CORPORATION

Engineers—Contractors

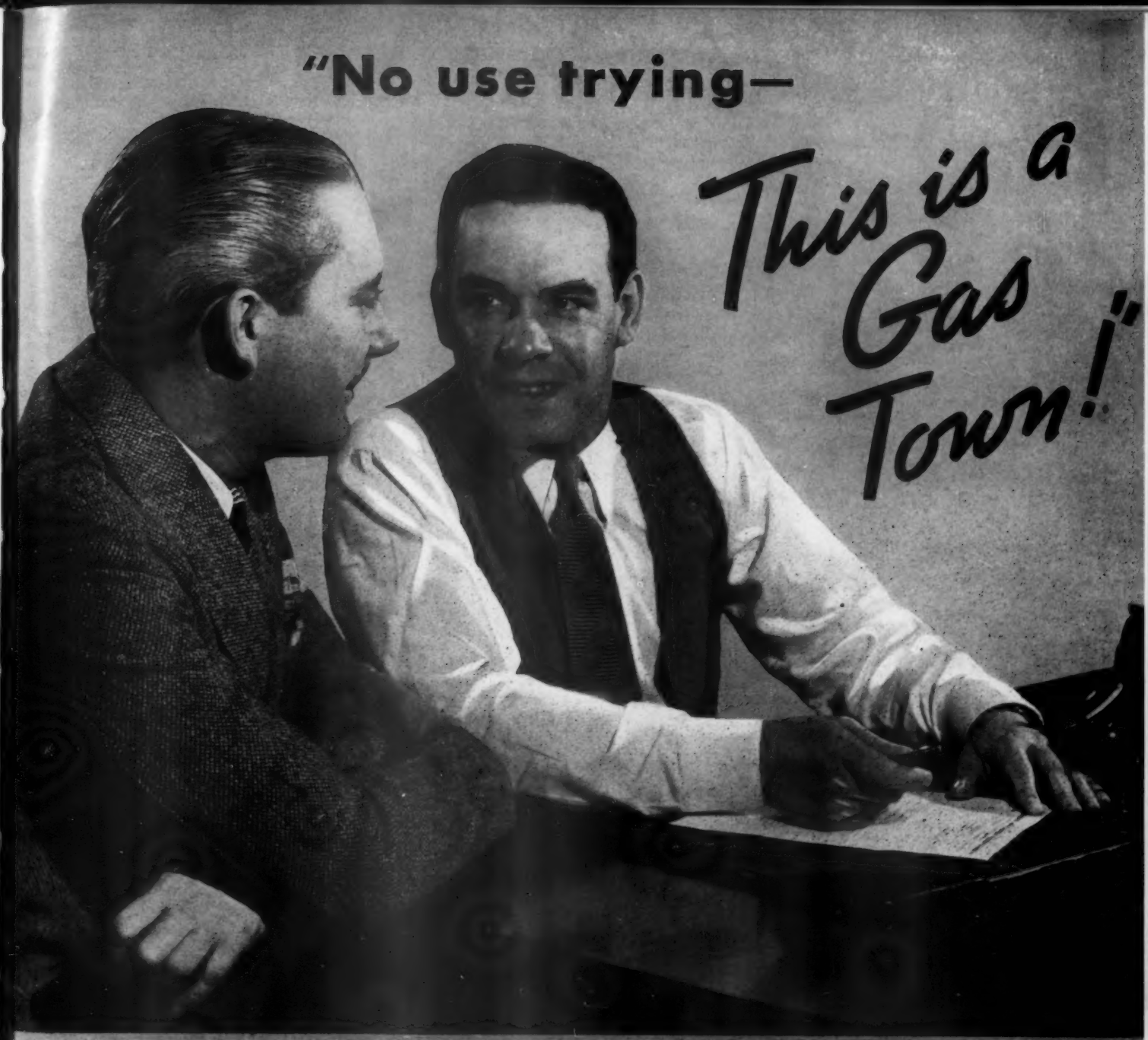
40 RECTOR STREET, NEW YORK, N. Y.

Within a decade the efficiency, facility of installation and bottle-tightness of *mechanical joint* cast iron pipe have been so thoroughly demonstrated as now to be taken for granted. This modern combination of the established stuffing-box principle and a century-proved material is available from Cast Iron Pipe Research Association members in diameters from 1¼ to 84 inches.

CAST IRON PIPE

THE STANDARD MATERIAL FOR UNDERGROUND MAINS

The Cast Iron Pipe Research Ass'n, Thos. F. Wolfe Research Engr., 1015 Peoples Gas Bldg., Chicago



CLEAN GAS MAKES SATISFIED CUSTOMERS

Competition is up against a stone wall where people are sold on the comfort, convenience, and economy of good, clean gas. But you can't afford to rely upon "home-made" equipment to keep enthusiasm for gas up and complaints down. Today the smaller apertures and more delicate mechanism of modern gas appliances demand cleaner gas than ever before. The way to insure continuous delivery of clean gas is to install BLAW-KNOX Gas Cleaners. They will help you to make progress in the face of any competition. Leading operating engineers the country over prefer them.

GAS CLEANERS BY

BLAW-KNOX COMPANY
FARMERS BANK BLDG.
PITTSBURGH, PA.

The Republic Prescription

• Everybody knows that the Republic Model A2 is the safe prescription for 85% of all gas home-heating conversions.

However some of you may not be aware that Republic offers 18 additional models to take care of the remaining 15%—those "ornery" jobs that are referred to politely as "pains in the neck".

We are listing just a few of the Republic prescriptions for some well known ailments:

"SMALLITIS" This disease is common to small steam or hot water boilers where treatment in the ordinary manner is as conspicuous as the neck on a giraffe. There seems to be more burner than boiler.

℞ **The Republic A2 Short Model—**
Six inches shorter than standard—
Eliminates cumbersome projection beyond the ash-pit—
Capacity, 100,000 to 210,000 BTU per hour—
Enough to do a real job of heating.

"APRONITIS" Prevalent in large warm air furnaces with deep firing aprons. Seldom fatal but the patient never looked the same.

℞ **One of the Republic "L" Models—**
They have the length of casing necessary to keep the controls in an accessible position outside the ash-pit.
Capacities— A2L, 210,000 BTU per hour
A2KL, 250,000 BTU per hour
A2SL, 300,000 BTU per hour

"DOMITIS" This is most malignant in boilers with a low dome and high rating—Operation very difficult. You can't use ether; you've got to give them gas—and plenty of it.

℞ **One of the Republic "22" Series—**
High capacity with low head-room—
Eight models to choose from with capacities ranging from 250,000 to 700,000 BTU per hour.

Write today for specifications on these Republic Models.

"You Can Do It Better With a Republic"

AUTOGAS CORPORATION

2258 Diversey Pkwy. Chicago, Ill.

General Sales Agent REPUBLIC HEATERS SALES CO. CHICAGO, ILL.

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SAFEGUARDED

. . . every Step!

● RIGHT-SERVICE DIAPHRAGMS . . . for new or repaired meters . . . are insured only by the perfection of every single detail. Considering the important function of the diaphragm, small initial "savings" may be decidedly "penny wise, pound foolish." Savings which fail to insure experienced manufacture . . . or uniformity . . . or flaw-free quality . . . can bring no real economy. Emphatically true of diaphragms! Every quality—every desirable characteristic determined by laboratory research, by field test and by wide diversity of installation—is found UNSKIMPED in the American Meter Company product. What better assurance of quality than a source of supply which today—because of adequate purchasing power—has access to prime leather selection, scientifically prepared impregnating formulas and exclusive methods of fabrication and seasoning? Like other AMERICAN gas meter refinements, diaphragm quality is being confirmed . . . by the actual performance records of meters in service.

● Our DIAPHRAGM RESEARCH BULLETIN shows the painstaking background implicit in quality merchandise. May we send you a copy—or consult with you on your diaphragm problems?

PROPER PACKING AND SHIPPING

This perfected method, developed over a period of years, has won the enthusiastic approval of our gas company customers. Note the carton built to carry fifty diaphragms. It contains four hollow square tubes. Over each tube the diaphragms are placed—four to a layer. On top and underneath each layer a piece of paraffin chip board is inserted. Thus, the diaphragm never comes in contact with the side of the case—but only with the paraffin chip board. ***Safeguarded in transit . . . safeguarded in handling!***

872

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AMERICAN METER COMPANY

INCORPORATED

GENERAL OFFICES: 60 EAST 42ND STREET, NEW YORK, N. Y.

OCTOBER
1937

AMERICAN
GAS JOURNAL

VOLUME 147
No. 4

The Annual Convention
American Gas Association

MARKET research, scientific and aggressive sales promotion and vigorous continuation of both local and national advertising were the themes of the 19th Annual Convention of the American Gas Association, held at Cleveland, Ohio, September 27th to 30th. The registered attendance was 2569 but it is estimated that there were at least 3000 present.

The convention activities were divided between the Cleveland and the Statler Hotels, the Natural Gas, Accounting and Technical sessions being held at the former and the General, Commercial and Industrial sessions at the latter.

The General sessions were opened on Tuesday morning (the 28th) with an address of welcome by Hon. Harold Burton, Mayor of Cleveland. In his brief address, which was one of the real features of the convention, He departed from stereotyped form and devoted much of his time to a most interesting discussion of the future of democratic government. He felt that this would be decided by the handling of city and state governments of moderate to large size rather than in the rural sections, small communities or the Federal government. Tuesday, the 28th, was also primary election day in Cleveland and it is not surprising that Mayor Burton, in addition to being renominated, received a majority of all of the votes cast. Mayor Burton unquestionably has the best wishes of all of those present at the convention.

After hearing a report by the Treasurer and electing officers for the ensuing year the convention listened to an able and encouraging discussion of industrial gas sales by Frank H. Adams, Vice President and General Manager of Surface Combustion Company. (Mr. Adams' paper is abstracted in this issue of the *Journal*.)

In one of the features of the convention, Walter C. Beckjord, Vice President and General Manager of

N. C. McGOWEN
President American Gas Association

Columbia Gas and Electric Company, told "What the Gas Industry Must Do Next." The following parts of his talk are particularly significant:

"From the peak of the 1929 boom the consumption of manufactured and natural gas by domestic consumers in the United States had declined some 11½% at the close of the year 1933. Part of this reduction was due to loss of customers, but the major portion of the decrease indicated a smaller consumption per meter. In the opinion of many economists the turn in the tide took place in 1933, and it would have been natural to assume that as economic conditions improved a gradual increase of the residential gas consumption would have been shown. There has been some slight improvement since that time. The number of domestic customers served is greater than ever before and gas house heating and refrigeration continue to gain in customer acceptance. But, in 1936, the residential sales per domestic meter for all uses including house heating, were still only 89% of the sales in 1929.

"Let us consider a few of the changes that have occurred in our manner of living:

a. Cooking for breakfast seems almost to have disappeared in the American home, except for coffee and toast, and that is frequently done on the table by electricity.
b. The family takes the old bus out for various trips in the evenings and over weekends, and patronizes the road houses and restaurants.
c. Tourist and trailer camps provide facilities for consuming sandwiches and heating coffee.
d. The tremendous growth of apartment house living in the large cities promotes the habit of eating out, reducing the domestic fuel consumption and increasing the hotel and restaurant load.
e. The home service students tell us there is less bread and cake baking by the younger housewives.
f. Greater use of pre-cooked or partially cooked foods, cereals, meats, vegetables, etc.
g. Less home canning—more purchases of canned products.
h. New theory of diet with less heavy hot meals, modern style and appearance, both men and women attempting to achieve the slender figure.
i. Increase in number of chain restaurants serving low-priced meals.

"During this period of depression and recession of sales, the manufacers of gas appliances have not been idle. They deserve great commendation for their courage and resourcefulness during a discouraging period when they persistently invested their own capital to improve the efficiency and utility of gas-burning appliances. The replacement of old, inefficient appliances by new ones, has made it possible to accomplish the same work with less gas and this may have had some effect on reduced sales, but in my judgment it is a minor factor in the situation, as the increased efficiency has been counteracted to some extent by the greater use of the appliances on account of the adaptability and modern thermostatic control.

"The sale of gas ranges still greatly outnumbers the sale of electric ranges. In the eight-year period, 1929-1936, 8,730,000 gas ranges were sold as compared with 1,213,000 electric ranges, but while the ratio in 1929 was ten to one in favor of gas ranges, that margin has now been reduced to about five to one, so it is quite evident the sale of electric ranges is accelerating at a very rapid rate.

"There are over fifteen million gas customers, so it is evident that only about half of them have ranges less than eight years old and while probably more than half the ranges sold in the last eight years have oven heat control, there is still plenty of room for the sale of modern gas ranges.

"On the other hand, there are a very large number of customers who have limited incomes and cannot afford to spend much money on domestic appliances. In some sections of the country they have turned in large numbers to the use of oil for cooking, because of its cheapness and convenience as compared to solid fuels. It apparently is reasonably satisfactory to many of them because they still continue to use it. This means that the gas industry is caught between the pinchers of a modern high-cost fuel on the one side, and a low-cost fuel slightly less convenient on the low side.

"As an operating executive whose interests are largely concerned with natural gas, I cannot emphasize the point too strongly that the natural gas companies of this country are not only going to be faced in the future with the same competitive problems as are now racking the brains of the manufactured gas executives, but they are in that situation now. The same conditions that caused the decline in the manufactured gas business are coming as certainly, though

CONRAD N. LAUER

WALTER C. BECKJORD

J. F. ROONEY

ROBERT W. HENDEE

D. H. MITCHELL

HUGH CUTHRELL

HALE A. CLARK

MERRILL N. DAVIS

HENRY OBERMEYER

J. V. POSTLES

New A.G.A. Officers for 1937-1938

President—N. C. McGowen, president, United Gas Public Service Company, Shreveport, La.

First Vice-President — Conrad N. Lauer, president, The Philadelphia Gas Works Company, Philadelphia, Pa.

Second Vice-President — Walter C. Beckjord, vice-president, Columbia Gas and Electric Corporation, New York, N. Y.

Treasurer—J. F. Rooney, assistant to executive vice-president, Consolidated Edison Company of New York.

Newly Elected Chairmen of Sections

Natural Gas Department—Chairman—Robert W. Hendee, Colorado Interstate Gas Co., Colorado Springs, Colo. Vice-Chairman—Thomas R. Weymouth, Columbia Gas & Electric Corp., Pittsburgh, Pa.

Accounting Section—Chairman—D. H. Mitchell, vice-president and general manager, Northern Indiana Public Service Co., Hammond, Ind. Vice-Chairman—H. A. Ehrmann, Consolidated Edison Co. of N. Y., New York, N. Y.

Commercial Section—Chairman—Hugh Cuthrell, vice-president, The Brooklyn Union Gas Co., Brooklyn, N. Y. Vice-Chairman — F. X. Mettenet, vice-president, The Peoples Gas Light & Coke Co., Chicago, Illinois.

Industrial Gas Section — Chairman—Hale A. Clark, Detroit City Gas Company, Detroit, Michigan. Vice-Chairman —Frank H. Trembly, Jr., The Philadelphia Gas Works Company, Philadelphia, Pa.

Manufacturers' Section—Chairman—Merrill N. Davis, vice-president, S. R. Dresser Manufacturing Company, Bradford, Pa.

Publicity and Advertising Committee—Chairman—Henry Obermeyer, assistant vice-president, Consolidated Edison Co. of New York, New York, N.Y.

Technical Section — Chairman—J. V. Postles, assistant to vice-president, The Philadelphia Gas Works Company, Philadelphia, Pa. Vice-Chairman—F. M. Goodwin, vice-president, Boston Consolidated Gas Co., Boston, Mass.

not so rapidly, in the natural gas areas. It is not always a question of cost to the customer but a question of being in style, the modern way, —the Electrical Standard of Living. Those of us who do not realize that situation as it now exists are simply putting our heads in the sand and ignoring the actual facts.

"The activities of the Commercial Section of the A.G.A. have since the early depression days been devoted to a very intensive solution of the problems. For some years sales conferences have been held in regions at which those on the firing line might tell their experiences and exchange views with others in their territory as well as other territories. Sales contests in the past three years have stimulated interest and imagination on the part of the salesmen through a system of competitive awards, and have undoubtedly helped very materially, especially in the field of modern efficient and beautiful domestic appliances for old, out-moded, unattractive, ugly gas ranges.

"There have been contests held on the sale of the gas water heaters and in the past eight-year period nearly 5,000,000 water heaters have been sold, not all of them automatic, but an increasing number each year. The sale of electric water heaters is only just beginning, but over 100,000 were sold in 1936, and with the promotional electric rates now available many of the electric companies are concentrating on an intensive sales program.

"The gas refrigerator has had a most interesting and romantic history. From discouraging beginnings, when most gas executives felt the expense of selling and maintaining them was not worth the effort, the gas refrigerator has become a most acceptable gas appliance and it is one of the bulwarks in holding the kitchen for gas. It amounts to a substantial base load and is one of the spearheads of our domestic sales effort.

"There has been a substantial gain in house heating due to the intensive campaign fostered by the A.G.A.

"The secret of success of most American industries today lies in mass sales. That is true of automobiles, radio sets, moving picture audiences and all the gadgets that go to make up the complex structure pertaining to modern American living. We must find ways and means of increasing our markets. In the years gone by, cooking with gas replaced lighting, then came water heating, refrigeration, house heating, industrial use and now comes the problem of air conditioning.

"Air conditioning as it exists today has been scientifically and efficiently developed, but not commercially.

"At the last meeting of the A.G.A. Board I offered a suggestion that some positive effort be made to put a moderate priced air conditioning unit on the market and also co-ordinate the efforts of the manufacturers and utilities along these lines because very little if anything is being done now. As a result of this suggestion, I found I had made a job for myself. President Russell has asked me to organize a committee along these lines and work will proceed at once to that end.

"The American housewife, once she is introduced to the comfort of an air conditioned home, is going to demand it in her own home and it will never be given up.

"Research, carefully planned and executed, together with intensified and unremitting national sales effort with which local sales plans are carefully co-ordinated, will go a long way in pointing out the plain pathway to an established future for the gas industry which serves American homes with the most flexible, most dependable and most economic form of controlled heat."

The complete text of Mr. Beckjord's paper appears in the October issue of the A.G.A. Monthly.

Mr. N. C. McGowen, President-elect of the A.G.A. then told of the various natural gas conservation laws and measures that have been put into effect and indicated the beneficial results they have produced.

There were no convention sessions on Wednesday morning, that time being devoted to a trip to the laboratory by member delegates and invited guests. Appropriate exercises on that occasion are described elsewhere in this issue.

On Wednesday evening there was a General session at which President Russell read his address. (Printed in full in this issue of the *Journal.*)

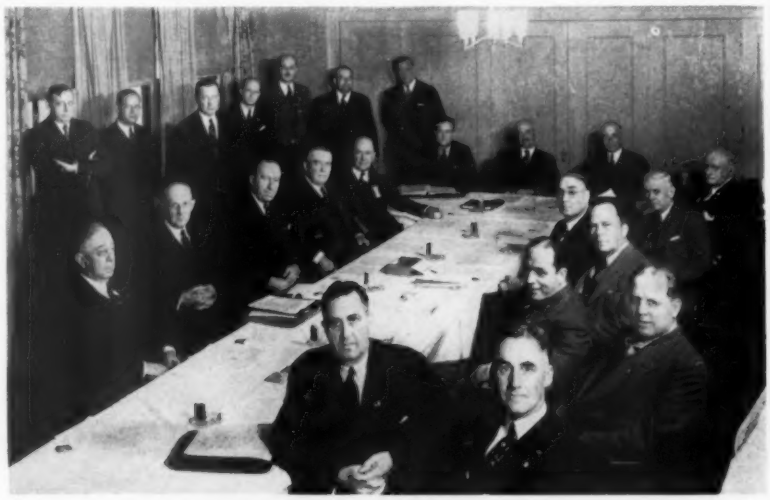
The final General session on Thursday morning opened with a report on the activities of the Rate Structure Committee, presented by G. I. Vincent in the absence of R. E. Ginna, the Chairman. Mr. Ginna was unavoidably absent on business of vital importance to the entire gas industry.

Charles C. Parlin of the Curtis Publishing Company discussed the vital need for active and aggressive advertising by the gas industry.

Hugh Cuthrell, Vice President of Brooklyn Union Gas Company gave an outline of work that is being done in preparation for the 1939 World's Fair. (Printed in full in this issue of the *Journal.*)

Col. T. H. A. Tiedemann, Manager of Industrial Relations Counselors, Inc., then discussed "Executive Responsibility for Industrial Relations" in an outstanding paper which we print elsewhere in this issue of the *Journal.* We commend it to both executives and employees for careful study. It covers thoroughly and ably a subject which is of vital concern to all of us.

A regular broadcast by the "Mystery Chef" from the convention platform and a talk by Dwight J. Baum, Consulting Architect on housing and on remodeling old houses concluded the General sessions.



Executive Board Meeting—Hotel Cleveland—September 27, 1937. Seated left to right: L. B. Denning, D. D. Barnum, T. J. Strickler, B. J. Mullaney, W. E. Steinwedell, K. R. Boyes, Herman Russell, President, Alexander Forward, Frank L. Chase, F. A. Newton, C. W. Bennett, W. C. Beckjord, J. F. Rooney, Norman McKee, George E. Welker, C. E. Gallagher. Standing left to right: H. C. Cooper, W. T. Rasch, C. W. Hunter, H. E. Cliff, N. T. Sellman, James F. Pollard, H. H. Cuthrell.

AWARDS

The Charles A. Munroe Award

One of the highest honors within the gift of the American Gas Association was conferred September 29 on George Wehrle, superintendent of the gas department of the Public Service Company of Colorado, Denver, Colo., at the second general session of the A.G.A. convention in Cleveland. Mr. Wehrle received the Charles A. Munroe Award for having made the most outstanding contribution of an individual toward the advancement of the gas industry.

The award was made to Mr. Wehrle for his distinguished work in directing the solution of the problems attending the conversion of the Denver system from manufactured to natural gas in the summer of 1928 and other problems which arose within his company during the subsequent nine-year period. In the opinion of the Charles A. Munroe Award Committee, these problems, a great many of which had not arisen previously in the gas industry, required a large measure of originality, ingenuity and pioneering. Classified broadly the problems were:

1. The conversion of physical equipment, both customer-owned appliances and company-owned facilities, designed and adapted to one kind of fuel, for a fuel of different physical and chemical characteristics.

2. The devising of changed practices and procedures to meet the changed conditions imposed on a distribution system by the new fuel.

3. The development of larger markets required to assure the financial success of the new procedure.

4. The accomplishment of the above with safety and the best interests of the customers.

In its recommendation to the Executive Board, the award committee stated that the solution of these problems "required much engineering research and the development and perfection of new and original methods and practices. This research and development was carried on by and under the direction of Mr. Wehrle. As rapidly as the engineering and economic validity could be determined, the solutions were shared by Mr. Wehrle with the entire gas industry and proved extremely valuable in conversions subsequently made by other companies. This is attested by the mass of correspondence with such companies and the numerous studies made by them of the Denver experience."

Mr. Wehrle has spent his active lifetime in the gas industry commencing in 1901. He has also participated effectively in many other and varied activities of the gas industry where his knowledge and experience have found expression in various technical committee assignments and in many papers. At present he is superintendent of the gas department and supervisor of the transportation department of the Public Service Company of Colorado.

The Charles A. Munroe Award consists of a substantial financial acknowledgment and engrossed certificate. The award committee consisted of F. C. Weber, chairman, C. W. Bradley, and F. F. Schauer.

GEORGE WEHRLE
Munroe Award

E. F. SCHULDT
Beal Medal

Award of the Beal Medal

Elmer Frederic Schuldt, assistant superintendent, central district, The Peoples Gas Light and Coke Company, Chicago, was singularly honored at the A.G.A. convention in Cleveland, for contributing the best technical paper to Association meetings throughout the year. Mr. Schuldt received the Beal Medal for his paper entitled, "The Precision Method of Locating Gas Leaks" which was presented at the Distribution Conference of the Technical Section held at Washington, D. C., April 12-14, 1937.

The award was presented at the second general session, September 29, by a representative of the family of the late W. R. Beal who established the award in 1897. It consists of a bronze medal and substantial cash payment.

The paper which won this outstanding recognition for Mr. Schuldt describes the development and operation of the Leak Locator, a unique and ingenious device for locating gas leaks with accuracy.

Mr. Schuldt was born in Chicago in 1901 and was graduated from the University of Illinois in 1923 with a B.S. degree in Chemical Engineering His entire business career has been with The Peoples Gas Light and Coke Company where he began as student engineer after his graduation from college. He is a member of the A.G.A. Corrosion Committee and a member and present chairman of the Gas Section of Western Society of Engineers.

F. A. Lydecker, general superintendent, gas distribution, Public Service Electric and Gas Company, Newark, N. J., is chairman of the Beal Medal Committee, whose unanimous recommendation was approved by the Executive Board. Other members of the committee are M. I. Mix, superintendent of distribution, The Peoples Gas Light and Coke Company, Chicago, and J. V. Postles, assistant to the vice-president, The Philadelphia Gas Works Company, Philadelphia.

AGA Laboratory Holds Open House

During the morning of the 29th, two one-hour sessions were held at the A.G.A. Laboratories followed by a tour of inspection through the several sections where guides explained to the visitors in detail the procedure of tests.

Following an address of welcome by J. S. DeHart, Jr., chairman of the Laboratories managing committee, George W. Allen, secretary of the Canadian Gas Association, explained that tests of Canadian appliances are made in the Cleveland laboratory, the seal of approval being practically identical with the American. The Canadian products however bear the seal of the Canadian Association.

B. J. Mullaney, vice-president of the Peoples Gas Light & Coke Co., stated in a brief address that the laboratory which represents a seven million dollar investment has paid for itself and that the American gas industry owns it. He stated that ten years ago only 20 out of ten thousand appliances met the modest requirement standards which then obtained while today for example, 95% of the ranges marketed bear the approval seal. Furthermore that the present types of fall enamel models bear the same price as the older models. That the standardizing of models is helpful in reducing the number of types made and has aided in meeting electric range competition.

On ranges alone 18,198 models representing 156 gas range manufacturers have been approved by tests and inspection. Under the latest standards, approximately 550 separate requirements are included which must be satisfactorily met before approval is granted.

Merrill Davis Elected President of A. G. A. E. M.

Address of W. T. Rasch

MERRILL N. DAVIS
President A.G.A.E.M.

THE second annual meeting of the Association of Gas Appliance and Equipment Manufacturers was held at the Hotel Statler, Cleveland, O., on September 27th.

Mr. Merrill Davis, Vice President of Dresser Mfg. Co., Bradford, Pa., was elected President of the Association, Mr. E. R. Guyer, Vice President. Cribben & Sexton Co., Chicago, Ill., was elected Vice President. Mr. Donald McDonald, Secretary of American Meter Co., New York, N. Y., was re-elected Treasurer.

In his address, Mr. W. T. Rasch, outgoing President of the Association, stated:

"The Association now concludes the second year of its existence. This is a good time to review what our purposes are; what we have accomplished to date; and what our policies may well be for the future.

"Our association has all the usual purposes and functions of a trade association. The association represents the manufacturers on all matters that should be dealt with from the industry viewpoint. Our aim and purpose is to cover the entire field of industry representation. That field includes:

(a) Representation of the industry in conferences with its customers;
(b) Representation of the industry in conferences with its competitors, and
(c) Representation of the industry in conferences with governmental authorities.

"Our industry and its trade association, this association, has exceedingly pleasant and well-established relationships with its customers. Approximately one-half of the product of the industry is sold through the gas utility companies. We are in affiliation with the American Gas Association, which represents these gas utilities and, therefore, we are in close and continuing contact with the distributors of approximately one-half of the products of the industry.

"The other half of our products is sold through mail order houses, department stores, plumbers and other retail outlets. These methods of distribution are growing in volume and importance. This association, as your trade association, intends to take every opportunity to confer with representatives of these methods of distribution. We reach many such distributors directly through our sales contests and sales promotion plans. We welcome the expression of their opinions and it, therefore, should be our aim and purpose to serve these distributors even better than we have in the past. I recommend to the incoming administration that ways and means be found to effect closer relationship with those customers who cannot be strictly considered as utilities. Many of our members do practically their entire business with such customers and, therefore, very naturally we should be in a position to serve them in the same way that we are now serving our utility customers.

"Our relations with our competitors are becoming better defined. Our industry is dedicated to the use of gas as fuel. Our industry believes that gas is the greatest single contributor to modern home comfort. Behind this belief we have placed a large investment in our manufacturing facilities and inventories, as well as an increasing investment in engineering research. We prosper as increased recognition is given to the fact that gas is an ideal fuel.

"Our manufacturers are in direct competition with all those manufacturers of appliances and equipment which employ other fuels. We are in direct competition with the manufacturers who serve the coal industry, the oil industry, and the electric industry. We should, and do, recognize that these competitors are able men, many of them are well-financed, and all of them are determined to advance their fuels as over against the use of gas.

"One of the functions of this trade association is to represent the industry in conferences with governmental authorities. It is our settled policy to conduct our trade association and our several businesses in such a manner that we do not invite or need any governmental regulation or support. We are aware of the increasing amount of governmental regulation of business. Wherever desirable, it will be the purpose of this association to represent the manufacturers as to governmental matters. We believe, however, that we as truly represent the manufacturers when we refrain from government regulation or governmental support as when we invite or encourage governmental rules.

"All of these important functions of a trade association have been carried out during our first two years. One of the strong features of our association is the fact that we represent all kinds of gas appliances and equipment. Each group has its own division within our association. Each division has its own executive committee and chairman and its own trade meetings. All of the work is united and coordinated through the Board of Directors, which includes representatives from each of the separate divisions as well as from the membership-at-large. Our organization plan has proven effective.

"Our association has been active in consideration of laboratory tests. It is our strong belief that our apparatus and appliances should be tested as to all reasonable safety factors. Such tests are welcomed by our manufacturers and every manufacturer is glad to have a seal of approval on his product as to any and all safety tests. In connection with such laboratory tests, however, there has been some confusion of mind as to improvements in appearance of apparatus and appliances and im-

provements in accessories looking towards better representations as to quality or efficiency of the individual products. The manufacturers have given most careful thought to this matter. It is the well-defined opinion of an overwhelming majority of the manufacturers represented in this trade association that laboratory tests should be confined strictly to safety tests and that such laboratory tests should not even give the suggestion of advertisement or approval as to competitive claims for appearance, for efficiency or for quality. It is our considered opinion that the same laboratory cannot successfully make safety tests and maintain safety tests and at the same time dabble in abortive attempts at research or product development.

"During the last two years the manufacturers have learned of their association's progress in research work. As this data is being accumulated, it becomes apparent that our manufacturers are spending hundreds of thousands of dollars in their own product development and in their own research work. This is exactly and precisely what should be done in order that the individual manufacturer may have every encouragement to continue and increase his research work. The results of such research work should be the sole property of the manufacturer who conducts the research. That is the only basis for any orderly growth of our industry. It is the record of the past two years that all of the division committees of our association as well as our own board of directors are firmly convinced that product research belongs in the hands of the manufacturers and is well taken care of there right now.

"We do not believe that the human cry of better appliances which one continually hears is justified. The gas industry as far as fuel appliances are concerned is in just as good a condition as the appliances of any competing fuel industry. The progress which has been made by the manufacturers in design, efficiency, and appearance of their appliances in the last three years is, we feel, far ahead of the progress made by competing fuel manufacturers.

"In anything I have said in reference to this subject it should not be understood that we are not in favor of basic research by the utilities through the American Gas Association's laboratory. Basic research belongs to them.

"In reference to the American Gas Association Laboratory, which we all agree is highly necessary to the industry, I can report that the representatives of all laboratory committees have been chosen by your association. Therefore, the misunderstandings which developed from time to time should now be entirely eliminated. The responsibility of the conduct of the laboratory rests equally with the manufacturer and the utility. I have no direct recommendation to make in reference to this subject except to urge, if possible, that closer cooperation be maintained at all costs.

"During the past two years your association has given a great deal of time and thought to the conduct of sales contests. During the past year the Gas Water Heater Division has conducted its second national contest with very encouraging results, exceeding in all respects the considerable success that we reported a year ago. The gas refrigerator sales contest is well known throughout the industry and is ably conducted. The Gas Range Division is taking an increasing interest in this matter as well as in the broader fields of sales promotion. Our association is now organized to handle sales contests and it is evident that all sales contests should be handled through our association or at least in cooperation with our association. This is of increasing importance because such sales contests must not only reach the gas utilities but must also reach all other classes of distributors. There is only one agency that can conduct a sales contest so as to reach all the kinds of distribution which we enjoy and that is our own association. This fact has become increasingly clear during the past two years. I recommend, therefore, to the incoming administration that thought be given to the employment of a coordinator of sales promotional work. I feel such a man could be of great value to the industry as a whole.

"In our relations with our competitors we must recognize always that our principal competition does not come from other manufacturers of gas appliances. Our competition comes from manufacturers of electrical appliances and of other fuel burning appliances. For example, the mechanical stoker has greatly increased the efficiency of coal in househeating. That efficiency has not been brought anywhere near to the efficiency of gas house heating in the house, but the competition is closer. We must continue to study what our competitors are doing not only in mechanical research but also in their national and local advertising plans.

"During the past year we have given attention to recently enacted legislation relative to price discrimination, the Robinson-Patman Act, and with reference to fair trade practice, the Miller-Tydings Act. Our counsel has prepared materials on these subjects which have been widely read by our members. We invite their further comment. It is the purpose of this trade association to inform its members on matters of general interest and our counsel has cooperated in that respect.

"This brief review of the aims and purposes of our association has included also a statement of my own opinion of the record we have attained during the past two years. We believe that the record is quite creditable for our young trade association. This is due to the fact that we now include in our membership 307 separate concerns. You must not forget that we are a very young organization in existence for only approximately two years. We have gone ahead as rapidly as we felt our industry could. More progress could have been made if we did not have the big problem of organization. I personally feel we are now well organized and in a position to pursue matters of importance to the industry very much faster than it was possible to do during this organization period.

"Our budget is sufficiently liberal to pay the expenses of our numerous activities and our budget has been balanced by the dues contributed by our members. We all feel that our treasurer is to be congratulated upon the financial standing of our association.

"During the coming years much hard work remains to be done in completing the numerous tasks which we believe have been started and well started within the last two years. For example, we have defined laboratory relations and our manufacturers have undertaken to be responsible themselves for research and engineering development in the industry. It is up to us to conduct our own research and our own development and to see to it that the manufacturer get his own reward in research and engineering development.

"The work ahead will continue to require the loyalty of the membership, and I believe we can count on just exactly that.

"In concluding this statement, I wish to extend my own heartiest thanks for the many kindnesses and considerations shown to me as your president during these initial two years."

Mr. C. W. Berghorn is Executive Secretary of the Association. Headquarters at 60 E. 42nd St., New York City.

The State of Our Industry

By
Herman Russell
President, American Gas Association

WHAT I have to say about the state of the gas industry matters little, but what we do about it is most important.

In order to correctly appraise the present situation confronting the industry and to plan intelligently for the future, it is well to take a look at the past and see what we may learn that will be helpful. It is an old industry, having its beginning in the year 1795, when William Murdock first produced gas by the distillation of coal. Through all the years the industry has grown steadily, always in the face of severe competition from other fuels. This in itself is a testimonial to the superiority of gas as a fuel and to those who have, through invention and development, kept the industry always to the fore. There is something about its age, its ability through the years to weather all attacks, all competition, and continually forge ahead, that augurs well for the future.

Today our industry serves 16,745,300 customers; has assets worth $4,979,772,000; employs directly 135,331 persons, and many times this number in those industries which supply its needs. Last year there was sold 1,573,907,000 M cu.ft. of natural and manufactured gas, bringing in a revenue of $770,242,000. The sales for the first six months of this year are more than 8 per cent in excess of the same period in 1936.

Truly this is a very large industry, serving usefully a major portion of this country's population; playing an important part in the industrial, commercial and home life of our people. This splendid record of growth and accomplishment is ample evidence of the important part the industry has played in human progress, and proof of the need it fills in the social order. This should give us confidence and faith in our industry and inspire us with the courage to go forward to still greater achievements.

Turning from this brief résumé of the past and the lesson it teaches, let us take a look at the present situation confronting the industry. The battle for the control of the fuel market is being fought on many fronts—coal, oil, electricity, gas are the combatants. In commercial and industrial applications, gas is steadily advancing,—manufactured gas for the first six months in these fields showing a 12.8 per cent increase in sales, and natural gas a 13 per cent increase. House heating also shows satisfactory progress.

In the home the fuel battle is being fiercely waged. Here, where gas reigned supreme, coal and oil—thanks to improved appliances—have returned to the fight and a new foe in the form of electricity, with colors waving and band playing, has joined the attack. The sales of manufactured gas for domestic use, exclusive of house heating, decreased 23 per cent from 1930 to 1936 and for the six months of this year, show a drop over the same months of 1936 of 2.9 per cent; and natural gas sales for the same six months of 1937, including house heating, show an increase of 3.8 per cent. Since 1930 there has been a decrease of 1 per cent in natural gas sold for domestic use, including house heating.

What are the reasons for this drop in the domestic use of gas? More homes are being constantly built; new consumers added; population is increasing. There should be a normal increase of domestic gas use commensurate with this increase. Why is this not taking place?

From a careful survey of conditions in Rochester and elsewhere we have come to the following conclusion. Not only is the gas industry facing increasing competition with other fuels for the domestic market, but it is facing the problem of changing habits of the American people in their home life and in their diet. Families are smaller, more married women are working, more children are going to school and eating their noon lunch away from home; whole families or parts of families are away taking week-end or holiday trips in the auto; more meals are eaten away from home. Women concerned about their figures refrain from eating pastry, bread, potatoes and turn to fruits and salads, which require no cooking. Bakeries have improved the quality of their products; fresh vegetables and fruits are available the year around; there is less cooking, less canning in the home. Laundries do a better job of home washing at a very moderate cost. Wash day and ironing day no longer mean peak load days for the gas company. Small electric appliances, convenient and economical in use, such as the toaster, percolator, waffle iron, egg cooker, have made the breakfast in many homes an all electric meal. The electric grill and roaster are also popular cooking devices.

Then there is the direct competition with electricity, coal and oil for the domestic load. Many new homes and some old are being equipped electrically. Improved coal and oil water heaters are offering stiff competition.

These are the factors responsible for the decline in the domestic gas load and these are the conditions to be combatted. What are we going to do about it? What of the future?

I take the liberty of quoting from a recent editorial in the English "Gas Journal," wherein the author comments on a paper presented by the speaker before the New York-New Jersey Sales Conference June last:

"In spite of the fact that there are very few electric cookers or water heaters in use in the city, the survey indicated that the average Rochester housewife is decidedly electric minded, thanks to electric light, the vacuum, radio, and so on, that she knows little of the merits and economy of the modern gas cooker, water heater and refrigerator, and that she has not been led fully to appreciate the benefits of having at command an ample supply of hot water.

"Perhaps a similar survey in this country would paint a somewhat rosier picture, but the future demands greater general sales effort, including the provision of attractive tariffs for gas sold, to bring about a better understanding on the part of the public of the many advantages in the way of economy and performance which gas has to offer. We require, as we have said many times before in these columns, more individual selling effort on the part of all engaged in or connected with the Gas Industry, so that the very great potentialities of gas may be viewed in proper perspective.

"The future of the Industry will also depend in large measure on the development of and improvement in processes and appliances—development as the result of co-operative research and investigation undertaken by gas undertakings

President's Address presented September 29 at the A.G.A. Convention in Cleveland, Ohio.

and makers of appliances. There can be no doubt as to the brightness of this future if the matter is tackled enthusiastically on these lines."

It has a familiar sound! Greater sales effort, attractive tariffs. Better understanding on the part of the public; more individual selling; improved appliances; co-operative research! And how are these objectives to be accomplished? Greater sales effort means better salesmen, more dealer outlets, financing plans for dealer paper, more campaigns, more showmanship in selling. Dealers will sell gas appliances if such sales are made attractive financially to them.

"Attractive tariffs" means a careful study of loads and markets, costs of service, and the courage to put the promotional rates into effect.

"Better understanding on the part of the public" involves more advertising, more Home Service work, replacement of old ranges and water heaters with new appliances. Do you know that many women (I would almost venture to say a majority) don't know what a modern gas range looks like? And, when they do see one, they think it is an electric range because it looks so nice, so like the picture of the "modern range they saw in the General Electric's advertisement in last month's magazine entitled—'Living the Modern Way.'" and if you think I exaggerate, let me tell you the true story of the wife of the vice-president of a large gas company who, passing the company's window wherein was shown a modern gas range, remarked, "Why does the company show an electric range in the window?" Does the housewife know that she can get more even temperature and better baking results in the oven of the modern gas range than with the electric range? Do your own employees know this?

"Improved appliances." There is much room for improvement in the efficiency and handy features of ranges, water heaters and refrigerators. Because of the wide thermal margin gas appliances possess over electric, there has been in the past too great a tendency to let well enough alone. This is why nearly half of the gas ranges in Rochester homes are over seven years old, and why less cooking is being done in the home.

Some recent surveys show that where an old range is replaced with a new one, gas use increases in spite of the increased efficiency of the new range. We have been telling our customers that the ranges, water heaters and refrigerators they buy will "last for twenty years." If that is the measure of our inventive genius, our ability to progress, then the gas industry is indeed in a bad way. Some one has truly said that the way to make people buy new goods, new appliances, is to make them dissatisfied with the old. The appliance manufacturer who is reluctant to change models to improve the efficiency, style and usefulness of his product; who hesitates to spend money on research, curtails his market and defeats his own ends. Let's take a lesson from the automobile industry and not be afraid to progress.

"Research." Research spells progress. Any industry that fails to carry forward an adequate program of research—both applied and pure—is on the road to oblivion. The marked improvement in domestic and industrial gas appliances in the last three or four years has been very largely due to the research work carried on by the American Gas Association through the able committees directing the work. Appliance and equipment manufacturers are giving more time to and spending more money on research. The program must be extended and intensified.

A comprehensive program of Pure Research should be financed and worked out in co-operation with our Universities. Gas—both artificial and natural—offers tremendous possibilities as to by-products. At least one university has already reported encouraging progress as to compounds to be made from natural gas, and in the far West, the Portland Gas Company is cooperating with the State University in the study of by-products to be made from the oil gas process. There should be more—many more such instances. I cannot plead too strongly that we as an industry and as individual companies establish gas research fellowships in our colleges and universities.

And what of the changing habits of our people and the effect on our domestic load? What can we do about this? I think we can do much and I am going to quote from an article which appeared in the *New Orleans Times Picayune* entitled—"Two Million Americans Never Saw an Elephant."

"Every year two million babies are born. Every year one million boys reach the girl-crazy age and start shaving the down off their chins for the benefit of a million young women suddenly become acutely clothes-and-cosmetic-conscious.

"AND year after year, in spite of everything, two million young folks up and get married and start new homes. Every day in every year new people become interested in ads of diamond rings, electric refrigerators, twin beds, plumber's friends, lawn mowers, baby carriages, high hats and evening gowns. Yesterday they weren't interested. Today they are. Tomorrow other people will be.

"That's why it pays to keep on advertising, and advertising, and advertising. The market is not static, but changing. You're not advertising to a grandstand, but to a parade always on the move, continually bringing new eyes over your ads."

Always a market of two million people to appeal to; to convince of the advantages of the joy of home cooking; to show how to make bread and cakes and pies the way Mother used to make them; to convince that hot water used plentifully in the home kills germs; will keep them, their babies, their families clean and healthy; that the gas refrigerator will keep their food fresh and save them money in their food purchases. Two million babies, school children, to be raised, taught, educated every year. Yes, there is much that we can do through advertising, sales effort, home service contacts, every year to change the customs of the people as regards the use of gas service in the home. A recent survey made by one gas company showed that 66 per cent of the customers interviewed had read the A.G.A. advertisements appearing in the national magazines.

The future of the gas industry depends upon how ably we carry forward the programs I have attempted to outline. Because of the lack of a General Electric Company in the gas industry, much of the program of research, sales promotion and creation of public acceptance, must be carried on by the industry as a whole. The national advertising and A.G.A. Laboratory projects are fine examples of cooperative industry effort. These and the many other steps in the program will require increased financing on the part of the industry. Let each of us individually do his part and the job as a whole will be done.

I have departed somewhat from the traditional "President's Address," but if my remarks prompt those in our industry to greater effort, then your time and mine will not have been wasted.

I cannot close without reminding you that Presidents come and go, but the work of the Association, year after year, is ably carried on by Major Forward and his most capable staff, under the direction of a splendid executive board and with the aid of many fine committees and chairmen. The reports and papers presented at this Convention are sufficient evidence that the job is being well done.

Executive Responsibility for Industrial Relations

by

T.H.A. Tiedemann, Director

Industrial Relations Counselors, Inc.
New York, N. Y.

T. H. A. TIEDEMANN

Colonel Tiedemann is a nationally known authority on Industrial Relations. In 1920 he joined the staff of the Standard Oil Company of New Jersey and became associated with C. J. Hicks who had then recently taken over the organization of its industrial relations program. In 1934, Colonel Tiedemann became executive head of Industrial Relations Counselors, Inc., an organization established in 1926 with the backing of John D. Rockefeller, Jr. Its staff of twenty-five people is devoted to research in the general field of human relations in industry and also provides a consulting service for industrial corporations and employee groups all over the country. It would be difficult to find anyone better qualified to deal with the subject of Employee Relations.

THIS paper is predicated on the assumption that the members here differ in their approach to the labor problem and have the same varying record of accomplishment as do the individual firms in other large industries and lines of business. These variations and differences are familiar to us because for years they have been presented in intimate detail by company executives when they make their initial calls on Industrial Relations Counselors, Inc. I am further supported in this assumption by the opinion of most informed industrial relations executives, who are in practically unanimous agreement as to the chief weaknesses in the labor thinking, as well as the sins—principally of omission—on the part of altogether too many topside managements.

It is easy to take what appears to be the line of least resistance and to play ostrich concerning the necessity of determining without bias or self-deceit just what policy or philosophy of labor management you and your company should pursue. The most serious charge that can be brought against a large segment of industrial executives is that of procrastination, or the failure to do promptly those things which they well know they should do.

There is a great deal of defeatism in the air at this particular time. Many executives are either confused or discouraged. This attitude leads me at the very outset to emphasize that an industrial relations policy, if it is to persist and be successful in the long run, must be determined squarely on the grounds of principle and not of expediency.

I am sure that all of us here are agreed that by the term "industrial relations" we mean something much broader than whether a company does or does not deal with a union, although this particular phase is attracting most attention and discussion just at present. "Industrial relations" is a short convenient phrase used to designate all of the elements involved in the relationship between employees of any class and the individuals or companies for whom they work. These many-sided contacts go far beyond the question of unionization. It seems obvious that one of the first responsibilities of the executive and supervisory forces of the company is to build up and maintain proper relationships and policies affecting all the employees of the organization, and that the necessity for the right kind of relationships between employees and management is not affected by the presence or absence of a labor union.

We have already referred in general terms to the variation in the approach to labor matters which characterizes American industry. But when industrial relations methods are analyzed from the standpoint of the labor philosophy on which they are based, they fall into four major groups.

The first category which may be referred to as the **Autocracy of the Employer**, would seem to be definitely outmoded in the light of today's conditions. Under this designation are included those firms where all rules, regulations and decisions are handed down from on high. The workers take what they get and like it, or leave, or get fired. This is the system which has been predominant in American industry; and none can deny that it proved successful for a great number of years in many, many concerns. I presume that U. S. Steel, during the period when its destinies were guided by Judge Gary, and the Ford Motor Company during all its history, might fairly be cited as outstanding examples of this type of management. While

Delivered before Nineteenth Annual Convention of the American Gas Association, Cleveland, Ohio, September 27-October 1, 1937.

this was the prevailing philosophy of management over a long period. there can be no doubt but that in large companies particularly it is gradually being changed and that it will be met by increasing opposition.

The second group includes the practices of companies which by entering into one or another of the various union arrangements or agreements have accepted the philosophy of **Capital vs. Labor.** Such managements generally act on the policy, either of their own volition or because they believe it necessary, of granting the absolute minimum by way of concessions here and there which will obtain for them the acquiescence of the leaders of the particular unions in which their employees are organized. This is the philosophy taught in England by Sydney and Beatrice Webb, whose adherents in the ranks of economics, industry and labor believe that a capitalistic society creates class distinctions and that only through complete unionization can the worker achieve the bargaining power which must be his to assure economic balance. The phrase "collective bargaining" as used by this group carries with it the idea of cleavage between the employer and his people and settlements based on conflict. While there is question as to whether a system born of European conditions can be applied in the United States, it must be admitted that there are many instances which can be cited in its favor. There are some good unions in this country and many examples where managements, employees and the union officials concerned have dealt peacefully to their mutual advantage over considerable periods. There can be no doubt but that in some industries and some companies the vertical unions have a proper field. There are others where the craft unions are required. I think it can be stated, however, as a broad generality that unions in this country have been, and in my opinion will be, successful chiefly in those organizations which, because of economic or other conditions, are more or less decadent. The coal industry and the railroads may be cited as outstanding examples, and the garment industry as another, although there the decadence is of a different sort.

Third is that group of programs predicated on the belief that in the American scene there is a place for friendly dealing and **Co-operative Effort** which will bring about economic justice for both the worker and his employer. Managements with this philosophy believe, not as a matter of theory or pretense, but as actual fact, that the interests of the employee and the employer are essentially the same and therefore are subject to mutual consideration and concern. This is particularly so because in this country class limitations have been almost lacking, as compared with Europe. Men have risen freely from the ranks to managerial positions, and the laborer of yesterday is quite often the director of today.

It was chiefly among larger companies where this philosophy prevailed that employee representation plans grew up during the period between 1914 and 1937, the year when the Supreme Court validated the National Labor Relations Act. Some of these plans initiated in the war period were pretty bad, but others were genuine and worthwhile. Suffice it to say that up through 1930 there was a marked growth, and then again under the guns of NRA a still further expansion. Even in the latter period, when there was considerable cause to doubt the underlying sincerity of many companies that initiated such plans, some sound plans developed which unquestionably had the support and interest of the employees.

This movement as far back as 1920 caused considerable fear and concern in the conventions and executive offices of the A. F. of L. I believe that students of labor affairs will agree that organized labor at that time made a serious mistake in attempting to throttle these new groups rather than to win them over.

At the moment, none of us knows just what lies ahead for the former representation plans, or company unions as they were dubbed by organized labor. I believe that there are hundreds of thousands of employees who are thoroughly sold on their ability to deal with their employers through the type of machinery and leadership set up under the representation plans.

A good many gentlemen in this country, particularly in Washington, like to believe, or to say that they believe, that all of these company unions and employee associations were begotten of the devil and are the poor tools of crooked employers. There were some cases where undoubtedly this has been true; but by and large, in my opinion, it was not and is not true. I foresee that many employee associations, independent of their employers, will continue to operate to the satisfaction of their constituents. It is unlikely that they can be legislated out of existence.

If no repressive legislation had been passed, employee representation, in my opinion, would have been limited to those industries and companies where the financial status and general working conditions permitted broader and more generous labor policies than could be supported by the general average of industry. At the moment it would appear that history is repeating itself and that the prohibition of this medium by the Wagner Act and the many so-called little Wagner Acts has failed to kill it. Instead of this, employee associations based on the representation plan principle are springing up not only in those concerns which formerly had representation plans, but in a great many places where such plans would not have been initiated by the employer or by the employees under the conditions existing prior to the Court's action. It is impossible to say how much of this latter growth is due to a real desire on the part of employees to deal with their managements through this means as a matter of principle, and how much arises from the desire to establish defense mechanisms against outside organizations or to protest against the prohibitions and unfairness of the various so-called Wagner Acts.

The fourth group takes in organizations where it is possible, usually because of the small size of the company, for the **Individual to Deal Directly** in some manner or other with his employer. It is in relation to that group in particular that I believe there exists in this country a great misconception as to the need or desire for unionization. While presumably unions have their field and will continue to maintain a place, I believe that there are millions of workers in this country who do not wish to belong to and cannot be persuaded to join any type of labor organization.

In this connection it is important to remember that in 1929 in the manufacturing industries of the United States, for example, over 2,500,000 workers, or approximately 30 per cent of the number then engaged in manufacture, worked in plants employing 100 or less workers. Incidentally, in that year 194,000 plants out of a total of approxi-

mately 211,000 employed 100 or less workers. I have unofficial information to the effect that a recent survey made in connection with the unemployment insurance problem in the State of New York showed that more than 90 per cent of the employers in that state have on their payrolls less than 100 people. In the light of these figures, particularly since the unions, generally speaking, seem to prefer to organize the large concerns, there is every reason to believe that many millions of workers in this country will never be members of any labor organization.

In addition it is important to state as a generality that membership in a union is a second choice, both from the standpoint of the employee and the employer.

Every company represented here comes under one or another of the four categories which I have just described. It may be that there are some who still insist on their right to maintain autocratic control of all labor relations. If this is so, I can be of little help to them but my advice is "Don't." But whatever your basic philosophy and your personnel activities may be, it is essential to good employer-employee relationships that you formulate a clear-cut statement of your labor policies and publish them for the information and benefit of all employees. The employer who fails to crystallize and reduce to writing the outline of his industrial relations program is in an unfortunate position.

1. Labor Policy

Specifically, what should a labor policy cover?

a. Collective Dealing: Since the Wagner Act clearly states the legal necessity for collective dealing, and also because it is good business, the management should announce that it is willing to deal with the employees or their representatives, and that the employees have the right to organize if and as they deem fit without coercion, intimidation or improper influence on the part of management.

Before going to the next plank of the platform, let me say in reference to collective bargaining that many managements are inclined to take too legalistic a view of this matter. Surely the Wagner Act does not prevent an employer from exhibiting an attitude of friendship and co-operation toward his employees. While he must avoid scrupulously anything which the employees might interpret as irregular or coercive, he can certainly express his views and ask for theirs, provided that in any problem concerning their method of choosing representation or bargaining agency, the decision is left entirely to them. All too often executives fail to keep themselves in touch with employee contacts and viewpoint. They should plan a routine which will take them into the employee areas at regular intervals. Provision should be made so that topside executives will meet and talk with a number of the rank and file personnel each month. In my own experience I have seen too many disastrous decisions concerning industrial relations matters made by boards of directors and high company officials who had long since lost all contact with or practical knowledge of employee attitudes and reactions.

Now to return to the matter of your labor policy.

b. Wage Policy: Second in importance only to methods of collective dealing is a company's wage policy. Have you notified your employees that it is the policy of your company to pay at least the prevailing scale for similar work in your community and to take cognizance of changes in the cost of living? Have you established wage differentials or methods of compensation which reflect differences in relative responsibilities, skills and performances, and have you assured the effective administration of this system by periodic review of individual earnings?

c. Hours of Work: Working schedules are frequently a matter of concern to employees, who are placing more and more emphasis on a certain measure of leisure. While I realize that generalities are unwise, I question whether any of you can now justify regular schedules in excess of forty hours per week. My advice to any management is to study seriously the ways and means of going to forty hours and to initiate the reduction voluntarily as soon as possible.

d. Overtime Rates: There is a growing trend toward paying time and a half or better for work done in excess of regular daily schedules or in excess of forty hours or whatever the schedule is per week.

e. Holidays and Vacations: If certain holidays are observed the employees should be so informed.

Two years ago there was a good deal of discussion about vacations but at that time the policy of granting vacations was not widespread. When we consider the great number of plans that went into effect during 1935, 1936 and 1937, I believe there is no question but what vacations with pay for wage earners may now be termed standard practice.

f. Promotion and Layoff: With the diversity of opinion that exists relative to the importance of seniority it is imperative that the policies of your management as regards promotion and layoff should be understood by every employee. In the interests of clarity, let me add that I believe thoroughly in full discussion of this matter with the employees so that it is understood that in the matter of promotion and layoff demonstrated ability shall be the first consideration.

g. Sickness and Accident Benefits: Every gas company has a definite policy as to pay for accidents and that policy, as well as the practice relative to pay during periods of sickness, should be known to the entire organization.

h. Group Insurance and Pensions: Many of you have group life policies and, more important still, pension plans. Your employees are entitled to know exactly what the rules are for each and how the company handles its part. If your employees do not enjoy these privileges, I earnestly recommend that you consider the social and economic value of providing adequate safeguards beyond legislative requirements against the hazards of disability, old age and death.

The Social Security Act has been declared constitutional. It follows that there will be a growing interest in it on the part of all concerned—employers and employees alike. It would seem that the employers would do well to examine particularly the pension feature and determine whether or not in their opinion the benefits which will accrue to the employees of their particular companies are adequate. My thought is that the government plan is intended to produce what might be called a minimum, and there is little doubt but what employers generally should supplement the government benefits by privately operated plans.

What we have discussed thus far relates to the matter of a posted labor policy. But there are other fundamentals which have been discussed much of late and which certainly should be commented on here.

(Continued on page 86)

Serving American Industry

by

Frank H. Adams

Surface Combustion Corp.
Toledo, Ohio

FRANK H. ADAMS

AS of June 30, 1937, you reported 957,000 industrial and commercial customers. This compared with 925,000 a year ago and less than half as many—452,000—in 1929.

The increase in sendout grew from 692,000,000 MCF in 1929 to 918,000,000 MCF for the year ending June 30, 1936 and to 1,065,000,000 MCF in the year ending June 30, 1937.

The revenue increased from $204,000,000 in 1929 to $232,000,000 in the year ending June 30, 1936 and to $263,000,000 for the year ending June 30, 1937.

These figures indicate an increase in the past year, as compared with 1929, of 110% in customers; 54% in sendout and 29% in revenue.

These figures alone show an accomplishment which represents the growth of your business in the industrial field. Of more importance, however, is the fact that it is the gauge of the acceptance by industry of your product—gas service. That growth rests on the sound foundation of service, economies and performance in keeping abreast of industry's production problems.

There are many reasons for the present position of gas in industry. Its acceptance as a preferred fuel, particularly in all process work and heat treating, has grown with every refinement in production methods where uniformity and controllability have been of ever increasing importance.

The manufacturing industry—whether food, clothing, agriculture, automotive, steel, glass or railroad—today could not operate with the efficiency they do without gas. In many of the industries they would have great difficulty in operating to their present standards of quality with anything like the same overall economy.

Gas has won its place in this picture and has been an important factor in the progress made because it met two requirements.

First—as industry has refined its processes, increased its production, improved its materials and metallurgy, higher standards of uniform and dependable heating performance have been necessary. Gas fired equipment has met these standards.

Second—gas also has those inherent qualities and added values in processes where the chemical and metallurgical reactions of the gas with the product are an integral and important part of the process, as in carburizing and bright annealing. Here again we find gas is the dependable servant in producing these atmospheres.

We can take almost any industry and trace the romance and accomplishment which give adequate reason for industry's acceptance of gas service as it has met their requirements. For example, in the steel industry the comparatively recent drastic change to the continuous mill is one of the direct causes for all heating operations to go so predominately to gas. When 80 individual hand mills, each one subject to the variables of 16 individuals, are replaced by one continuous mill a new standard is born. It is significant that the steel industry turned to gas when determined not to lose the uniformity and quality gained in the continuous rolling operation.

The control panel of a modern battery of soaking pits as compared with the miscellaneous collection of hand operated dampers, gas and air controls, dramatizes in itself the use of a fuel which permits the uniformity of heating and control of the atmosphere to meet the requirements of the present day mill.

The gas fired slab furnace, the next reheating step after the soaking pit, has evolved from a single stage manually operated furnace into an automatic unit in which two to three zones are separately maintained both as to temperature and atmosphere. These modern furnaces permit 40% to 65% increase in tonnage, and fuel efficiency from 20% to 35% better than former furnaces.

In the annealing operation we have a fine example of the comparative strength and adaptability of gas. I wonder how many of you fully appreciate the significance of the development of what is properly termed "The Radiant Tube" system of heating. To you it is an alloy pipe placed on the walls of a furnace similar to an electric element—a tube with a gas flame throughout the greater part of its length. That is what it is to you. To the electric man it is a 6" or 8" heating element, gas fired.

The steel industry, prior to the advent of radiant tubes, had recognized the necessity for the uniform anneal which fixed radiant temperature zones, permitted and had even started in with bell covers using electric elements for these great tonnages. The gas fired radiant tube with no limitations on the heavy heating up demands, with their ability to maintain the temperature gradients essential to uniform heating during long annealing cycles and their full automatic control, met instantaneous acceptance by the steel industry. Not only has there been this improvement in the process requirements but it has meant a possible saving of over $2 per ton of annealed sheets. When you visualize that the ordinary size furnace han-

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dles 40 to 50 tons of sheets you can see that the savings of $100 per heat is a credit to gas in this type of application.

In the automotive industry the first problem in the pioneer days was in the changing a wagon builder's trade over to a machine production art. Fifteen years ago a conventional automobile weighed 6500 pounds and was equipped with a 50 HP motor. Today we put a 125 HP motor in a 3000 pound car. This evolution was in the main a metallurgical problem. The treatment of the alloy steels, the processes of carburizing and bright annealing, air drawing the carbon steels, the short cycle malleableizing for the malleable castings, even such details as the bright annealing of non-ferrous metal which permits the drawing of fine tubing, all played a major part in this modernization. Many phases of the development of these processes are directly attributable to gas. Gas has not only made many of these processes possible, but it has also fitted in directly with the reduction in cost that the 15-year-old car represents as compared to the modern car. Probably the most fundamental advance in the history of metallurgy was made possible by the opportune development of controlled gas atmospheres now so prevalent in the heat treatment of steel.

Formerly it was necessary, after heat treatment, to remove scale either by sand blasting or pickling and allow for proper tolerances. We now take the part direct from the furnace to the assembly line. The work, finally machined, is heat treated without scale or decarburization. Many times the savings in pickling and rehandling are far in excess of the entire fuel costs. It is significant that all of these atmospheres, regardless of the fuel used in the furnace for heating, depend on gas as their source.

In the vitreous enameling field the fact that no products of combustion can be present in the furnace atmosphere has made gas firing difficult. Now the radiant tube has furnished the ideal answer to this problem of utilization. During the past year 24 installations of this type have been made. In the radiant tube application to the continuous enameling furnaces, tubes over 90′ in length have been applied in which the combustion gases, after generating the temperature necessary for the firing zone, go successively through the preheat zone and the dryer. Such applications practically put gas on an even Btu footing with electricity and still possess all the advantages of the indirect radiant form of heating. A reduction in operating cost of a large continuous furnace from $5.15 per hour on 92c/KWH electricity to $1.35 per hour on 30c natural gas and a 43% increase in production indicates both the accomplishment and the reason for acceptance of gas.

In the malleableizing industry here again radiant tubes, which permit the use of controlled atmospheres, have reduced the heat treating cycle from 80 hours to 30½ hours, eliminated packing parts in boxes and pots, no dirt, no decarburization—a superior product at a saving of $2.25 per ton.

Uniform heating of densely packed parts in the low temperature range up to 1000° is attained in a most startling manner by recirculation and convected heat. This principle has almost displaced former designs in the drawing operation after hardening, and has proved an equally important factor in the glass industry in the natural gas territory. Direct fired annealing lehrs using convected heating represent a radical departure from the old indirect fired lehrs which were usually fired on oil and have surpassed most of the advantages claimed for the electric lehr. The present day lehrs have in some instances reduced the annealing cycle from 12 hours to 3 hours and have given a correspondingly increased production combined with an absolute accurate control.

It is important to appreciate that these technical advances are not applicable just to the examples I have cited, but represent broad principles which will find their use and value in every industry using heating processes. Industry recognizes their worth. You can take pride and confidence in the fact that the growth in customers and load proves their worth has been fully realized.

Against that background of sound performance and acceptance let me take just a few moments to analyze some phases of your competition. I cannot become seriously disturbed over the apparent self hypnosis of the electrical industry which leads them to the conclusion that any field is theirs, if it can be served electrically; that aggressive salesmanship can displace sound customer economics. The seriousness of it must be measured in terms of its effect on our own aggressiveness rather than the competitive merits of our service.

In most cases, about the only significance the loss of an industrial load to electricity means to me is that fuel cost is the least important factor in the operation. We have probably failed in salesmanship even with due allowance for mechanical and utilization competitive factors. Fifteen years ago the industrial heating field was headed towards electricity with considerable momentum. The electrical industry had all the encouragement and resources of their fine work in the industrial power field. In spite of the gas industry's lack of trained salesmen, proper utilization equipment and with an inferiority complex in sales aggressiveness, we see today's picture in which gas has won its place on the basis of sound and outstanding service.

The electrical industry does not consider operating cost the dominant factor in competition. They think they can sell new values in the home which make the higher costs acceptable just as a more expensive value in transportation with the automobile competes with the street car. So the competition is not in product so much as in sales methods and viewpoint. If you are going to sell on the level of price, you leave the door wide open for their competition to drive through on more acceptable concepts of value.

Your progress in the industrial field has been made by selling values which justify higher price. Isn't this the same principle the electrical industry is and always has followed? Doesn't it apply equally to your domestic competition today? This, I think, is the major lesson to be learned from your accomplishment in industry.

Let's look at another development coming up over the industrial horizon —the gas engine for power generation. The electrical industry has never shown any tender solicitude for the gas industry in their competition for load. They have always considered the fields of gas utilization their special right to invade. Is it possible that the gas industry is now ready to carry that competition into the industrial power field? It is already meeting the test of customer acceptance on a minor scale. As a measure of sales aggressiveness, what do you think our electrical brothers would do with it to worry you, if our positions were reversed?

The recent development, started by Ralph Wenner in Toledo, of mechanically connecting the gas engine through the induction motor to the mechanical load has a great merchandising merit, aside from its mechanical soundness.

I asked a moment ago by what record of public acceptance, performance or novelty serious inroads could

be made in the domestic field. Those factors are in good shape and give you something fine to sell. The competitive results will depend on your record of salesmanship. Failing in that, serious inroads will be made simply because the world stopped long ago beating a path to the maker of the best mouse trap—if it ever did. You must go to the buyer.

The fact is that, looking at the over-all field, the gas industry has established a sound foundation for a better planned and a far more aggressive merchandising of its service than we have yet seen. Many people closely and directly associated with the gas industrv are not selling the public because they themselves lack the enthusiastic initiative to enliven public interest.

Let us look at the industrial field again. Your industrial and commercial sendout for the year ending June 30, 1937 was 1,065,000,000 MCF. It was almost double the domestic sendout. On a Btu basis it was 120% over your domestic sendout. The industrial and commercial field represents, in manufacturing terms, your volume market. It has been put on your lines with a minimum of sales planning and, sometimes, even sales recognition. Yet, perhaps, paradoxically, that sendout is the result of some of the finest and most competent customer service you render.

In the domestic field you work up sales contests, run big advertising campaigns with billboards and radio hookups, give prizes, get all the employees together for pep meetings, give a final banquet with all executives present and give your praise and benediction to the sales department and all who helped to sell a thousand ranges which gives you an annual load of 24,000 MCF. Of the thousand sold perhaps nine hundred replace old ranges.

Don't misunderstand me—that is all very proper and commendable. I simply want to make a comparison between that picture and the attention and interest given to your industrial department when they come in the side door to their offices next morning with a 24,000 MCF industrial load, all new sendout, and receive a passing nod, if anything. What's wrong with that picture? Too many industrial departments are considered a sort of superfluous appendage and operate with an inferiority complex which is instantly sensed by the industrial executives with whom they deal.

As compared with your domestic revenue, you think you haven't the profit margin in your industrial load. How many of you know just what your industrial load is worth to you in your earnings statement? While we are asking questions, the answers to which will be helpful to any sales department—how much industrial load do you want? At what rates? At what load factor? What are your industrial potentials in terms of utilization values as compared with your existing rate schedules? How much time do you spend right out on the firing line so you get an accurate understanding of your industrial sales activity and lend to the sales effort the dignity and prestige of your executive position?

What is the standard of your sales department both as to morale and sales competency? In presenting the sale of your product you are competing not with just a product but for the attention of industrial executives. Industry uses the highest caliber salesmen they can find to sell their products. Many of their executives are the top salesmen of their companies and no executive is too high to be drawn into the sales department whenever the occasion demands. How does your sales department compare with that standard when it comes in to sell your product?

These comments I have made are just a reflection of my belief and confidence that the gas industry has built a wonderful record as a major fuel; that the principles on which it has been sold are sound. Our essential need for the future is greater confidence in what we have done, and, with that background, a far more aggressive and enthusiastic sales effort.

"The Road Back"

by

Hall M. Henry

Utility Management Corp.

"Findings"

First—Our manufactured gas companies' net revenues have fallen on the average, 35% from those prevailing in 1931.

Second—We can only progress on "The Road Back" by eliminating some kind of competitive fuel. Hence it means a fight to the finish to get back on our higher earning level.

Third—We have no well intrenched source of revenue that is non-competitive on which we can depend while we attack new markets. We have to put up a strong defensive, while at the same time making a most determined offensive. It means spending money to *hold on to what we have*, which is never as pleasant as spending money to secure new revenues.

Fourth—We start on this defense and offense—with some 80-90% of the appliances—in use and interpreting our product to our present and prospective users—obsolete. Visualize if you will what must be the attitude of our customers when they are thus forced to contrast our service with that offered by the modern appliances of our competitor.

Fifth—Studies made in some five widely scattered towns of various sizes—show that 50% of the customers have decreased their use—yet—and this is the interesting thing—50% of all the decrease is occurring among only 10% of the customers. Thus it is—in face of aggressive load building programs (where actual increases have been made among customers to whom appliances were sold) little if any increase has taken place in the *total* Domestic send-out.

Sixth—The Water heating load is following the fuel that is adopted for automatic House Heating.

Seventh—50% of all Gas Water Heaters are not being used regularly.

Eighth—Our competitors are aggressively attacking our present and prospective markets to a far greater extent than we are defending and

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carrying the offensive. *For instance in advertising:*

Oil Industry	$1,000,000	
Ice Industry	1,000,000	
Coal Industry	500,000	
G.E. (Two-fisted Bldg. Program)	750,000	Gas Industry's vs.
Collateral Adv. to G.E. Plan	1,000,000	$500,000
	$4,250,000	

This does not of course include the $10,000,000 to $12,000,000 spent by the Electrical Manufacturers on specific products, or that of the Oil and Gas appliance manufacturers.

For instance Man Power—Electric Refrigeration—20 or more to 1 Gas Salesman. Heating—oil—20 or more to 1 Gas Salesman. (1 Dealer alone in 1 large city has 1 salesman to every 1400 homes, while Gas Co. has 1 to 20,000)

Ninth—The bakery—canned food industry — restaurant — laundry — minor electric appliances (toasters, percolators, roasters, etc.) are decreasing our loads.

Tenth—Increased operating expenses amounting to 20% have contributed their part to the 35% decline in Net.

Eleventh—Lack of a united aggressive stand has been a large contributing factor — possibly greater than we today realize.

Twelfth—A replacement gas range does not decrease the load—there is a slight increase of 500 cu. ft/yr./replacement range (result of study of loads of customers where new range replaced old range—in five different towns of varying size).

Thirteenth—Complete Home Making vs. Partial Home Making will result in:—

(a) Savings of $150 to $200 per year in our customers' living costs.
(b) a 95% increased use of the Kitchen equipment. (Figures from Borsodi School of Living)

Fourteenth—We find our Domestic Gas rates generally satisfactory for cooking, water heating and refrigeration. For the latter two the average is $1.00/MCF.

Fifteenth—With the House Heating rates generally prevailing:—

(a) We are just about holding our own —or making slight gains.
(b) The selling costs are high.
(c) The Servicing costs are high.
(d) Companies with lower rates have made larger sales of House Heating at:—
  (1) Lower Sales Expense
  (2) Lower Servicing Expense

All of which results in more net per Domestic Customer.

Sixteenth—The net revenues of our Gas Companies in combination territory does not show as satisfactory an earning position as do our Gas Companies where they compete with Foreign Electric companies.

The following plan is based on the above findings; which we realize will need to be adapted to suit local conditions. Many of our Gas Companies can and are doing better than the plan calls for; others may not be able to do as well.

The Plan

The Objective:

The objective of this plan is to bring the Net Earnings of each Gas Company up to the *level* of 1931—in *three* years.

The Program:

The plan will be known as the 3-R Program.

The First R—Stands for *RETENTION*—and signifies we propose to do something about our present loads. We do not intend to sit idly by and watch 50% of our customers decrease their use of Gas—with 10% of them accounting for half of our decline. The attacks of our competitors and the inroads being made by the Bakery—Cannery—Restaurant—Laundry, etc., will no longer go unchallenged. We feel that little real progress can be made on "The Road Back" until we have fortified our present position and protected it from further attack. It is recommended this be done:

First: Through an aggressive drive to replace the old inefficient gas appliances with modern efficient—time saving ones—

Second: By correcting faulty water heating installations—and we still have many of these—

Third: Through personal contact by specially-trained customer representatives (Home Service or Home Economists, call them what you will). At least one representative for every 3,000 domestic Gas customers.

We have too long neglected our cooking and water heating loads—even our House Heating customers. We apparently have gone on the premise that once our customer—always our customer. Our policy needs to be changed to one which recognizes the principle "Our customer with proper care and attention, anyone's customer with neglect". We have seen what has happened to our several types of loads through lack of proper safeguards—but surely we do not need to continue to make the same mistake. Selling new appliances alone is not sufficient to increase our sendout and revenues. The following table shows the % of customers sold new appliances and under "A" the amount of increase that should have taken place whereas "B" shows the actual increase. You may well question the estimates for increases. We did and therefore made a check of the bills of customers before and after, and found our estimated increases were actually taking place. The reason our average customer consumption did not respond was because of the decreases. Hence we need to do something about the Retention of our Gas loads.

Personnel Needed for Retention

We propose to assign the job of *RETAINING* present loads to some one person whose *first and primary* duty it is to *protect* our Revenues. The job of Retention will be distinct from the job of getting new loads. It is true they supplement each other, but the personnel required for each job must be trained differently. The job of the RETENTION personnel is to watch carefully the bills of customers who have, say, automatic Gas Water Heaters—to see that a falling off in consumption is not due to something which may cause complete or partial discontinuance of our service.

% of Domestic Customers Sold Various Appliances.	A Estimated Annual Increase per Domestic Customer from Appliances sold.	B Actual Annual Increase per Domestic Customer.
Company A		
19% Water Heaters 14% Ranges 1% Gas Refrigerators	2500 cu. ft.	800 cu. ft.
Company B		
2.1% Water Heaters 6.7% Ranges 1.9% Refrigerators	752 cu. ft.	200 cu. ft.
Company C		
14% Water Heaters 20.2% Ranges 3.5% Refrigerators	3250 cu. ft.	500 cu. ft. decrease

The Second R—Stands for *RECOVERY*. It is believed that many of the water heaters which are on our lines and are not being used at all, or only part time, represent a real opportunity to recover some lost revenues.

For instance, in one town the following results were obtained:

Heaters inspected	178
Heaters in full use	7
Heaters—revamped	178
Cost of revamping	$4,895.00
Cost per heater	27.50
Amount of revenue recovered	3,164.00

In this particular instance the Company decided to stand the entire cost of relocating heaters—running small copper tubing and even replacing old inefficient heaters free or at cost. It is believed a similar program can be carried on at a lower cost through having the customer pay a part of the expense.

Recovery of Dead Services:

Included in this *RECOVERY* program is to be a determined drive on Dead Services or on loads lost to competitors. A study of the number of services indicates some 10 to 12% are dead, representing a promising field of endeavor. In attacking this problem we will need to have data on the comparative costs of cooking by gas—coal—oil and electricity. We have some accumulated data made in homes of customers where the same menus were cooked for a week on one competitive fuel and a week on gas. This data shows a wide variation in the amounts of Gas used to cook the same quantity of food—and indicates the need for educating our customers in the proper use of our fuel.

The Third "R"—stands for REPLACEMENT of Obsolete Gas appliances for *Protection* and REPLACEMENT of Competitive products for *Increased Revenue*.

Replacement For Protection:

We can no longer neglect the REPLACEMENT of the out-moded, inefficient, obsolete Gas appliances which are on our lines to the extent of 80% to 90%. Our competitors fully appreciate the importance of keeping the appliances that are interpreting *their product* up-to-date and modern in every respect. Thus it is we find the Electric Utilities already making a determined drive to replace the old, slow out-moded electric ranges with modern *fast efficient* units; even the electric range manufacturer appreciates the importance of this replacement program and is willing to reduce the price on his range to former range users, to speed this replacement program. This is also true of certain electric refrigerator manufacturers. Hence, a most important part of any Gas Program looking to the present and future of our business must include a consistent and thorough drive on replacing obsolete Gas appliances.

In many instances the replacement of an old inefficient Gas appliance will result in a decrease in revenue. However, it appears (if we can rely on studies made in some six different towns of the Gas Bills of customers *before* and *after* a gas range replaced an old Range) there are many customers who increase their use and their increases offset the decreases with the result there is an actual increase of around 500 cu. ft. per year per range sold that replaces another Gas Range.

Replacement for New Revenue:

The Replacement of competitive fuels by Gas is our *primary* means of obtaining revenue. We may be able to secure some added revenue through the *increased use* of the Gas appliances on our lines, yet our *basic* means of increasing our loads remains as it has from the start, namely, the substitution of Gas for some other method of cooking, water heating, Refrigeration, House Heating, etc. Hence, any load building program must recognize the highly *competitive* nature of our Business. We must realize that the market for our product is also the market for a number of competitive products. Hence, if we want to Get Back on the Road to increased earnings through the replacement of competitive products we need to attack this phase of our program with far greater sales effort than has characterized our feeble attempts to date. We have underestimated our competitors and failed miserably in the matter of *matching* Salesman power, advertising, showmanship, and market research. If we are to recover our former earning position, we will have to set a *real objective* and then supply the needed Salesman-power, advertising, etc. needed to reach this objective.

What Salesman Power is Required:

Domestic Sales Force

In order to sell 10% of our customers gas ranges, 4% gas water heaters and 4% gas refrigeration in one year—with the company selling 25% of the gas ranges, 70% of the gas water heaters and 75% of the gas refrigerators—it will require one company salesman to every 1200 to 1400 Domestic Gas Meters. This is on the basis that a salesman can sell 100 to 110 major appliances per year, or, 33 ranges, 37 water heaters and 40 refrigerators. A study of the sales performance of salesmen in some forty gas companies shows that this is not too large a quota per salesman.

In addition to the field salesmen, we recommend the use of one supervisor to each 6 to 10 field salesmen. Thus our Salesman Power for our 100,000 meter town would be—

76 Domestic Salesmen
10 Supervisors

House Heating Sales Force

To sell 1% of our single and two family customers House Heating in one year and 50c/MCF rate will require one House Heating Salesman per 3000 to 3500 Single and Two family Houses. This is on the assumption that one House Heating Salesman can sell from 30 to 40 Heating jobs per year, which represents our findings after a study of the sales performances of a large number of gas companies. We further recommend one House Heating supervisor for each 5 field salesmen.

What Should Be Our Objective:

Is it too much to set as our objective the Recovery in three years of the amount of net revenue lost during the past 6 years? Or is three years too long a period to take to get back to our former earning position? The starting point on "The Road Back" is the setting of a definite objective or goal. Our companies' objective is to reach our 1931 earning position by 1941—through New Business efforts alone—any economy in operating expenses will add still further to the earnings.

Consolidation of Company Operations

Acquisition by two newly formed companies of the gas and oil properties formerly owned by United Gas Public Service Company and three subsidiaries, United Production Corporation, Northern Texas Utilities Company and Southern Gas Utilities, Inc., has been announced by N. C. McGowen, president.

The new companies are Union Producing Company and United Gas Pipe Line Company. Union Producing Company has acquired all gas and oil producing properties of United Gas Public Service Company and these subsidiaries, and all natural gas transmission facilities, including gasoline extraction plants, formerly owned by these companies have been acquired by United Gas Pipe Line Company.

Since all the functions previously performed by four companies will now be concentrated into the two new companies, the change represents a further step in the simplification of the corporate structure and operations.

"Showmanship in Business"

Summary of Address

by

K. M. Goode

New York, N. Y.

Showmanship, as its *essence*, deliberately reverses the time honored advertising habit of boasting publicly about one's own goods. And sets out to interest and entertain the customer in terms of *his* excellence.

Let me show you exactly what I mean. At your great World Fair, you may remember, the Western Union had a set of three dozen ready-made "form" telegrams for visitors to wire their friends in place of their forgotten letters. These stereotypes were varied to suit all classes. The least used telegram, records showed, was this

> "The future of the country that has produced what this Fair commemorates cannot be in doubt. It is an inspiring exhibit."

The telegram the American public did choose to express itself read:

> "My old dogs are tired. But it's worth it to see all there is to see."

Showmanship recognizes the *facts* behind these two telegrams. Instead of trying to force people to talk or even think in terms of his inspiring exhibits, the modern leader enables them to express themselves in terms of their own perspiring feet.

Showmanship—to win—must be more than square. It's a triangle: all three sides begin with "S".

(1) Simplicity — (2)—Sincerity — (3)—Service.

As soon as we have glanced at the theory of those three S's, I'll give you a six-squint check-list for practical use which will, I hope, help you sort out the surefires from the duds.

First take simplicity. Uncomplicated, of course. But more than that: Not enough merely for the meaning to flash crystal clear, its *emotional appeal* must penetrate instantaneously *through* to whatever human strength or weakness it is intended to exploit.

An automobile dealer, for example, sold a third more prospects by covering his salesroom walls with mirrors to let women see themselves sitting at the wheel of their prospective car.

A man's hat dealer did even better by doubling his mirror space; and making his clerks hand customers their hats, with the *tops* pointing towards the floor, so their first glimpse of a hat was on their own heads.

After toying for three years with all sorts of spectacularly unusual exhibits, Radio City finally got around to drawing crowds with rabbits, flowers, and a big home-town skating pond. By planting some big trees and getting people to eat thereunder, Mr. Rockefeller keeps watching crowds constantly at the railing.

By "sincerity" in showmanship, I mean not so much the precise delivery of one's promise as a simple, natural basis for the proposition itself. Take, for a quick example, three *retail* stores just seen along the street. *"Uncle Sam's Army and Navy Store"* is a grand name for a small negro dispenser of khaki shirts and service shoes. *"The Wild Cat Store"*—prices run "wild" is almost as legitimate. A *"White Elephant Sale"* of checked dull colored dresses is, in contrast, stupidly insincere.

Just as "sincerity" in showmanship means mostly a ***natural human basis*** for an appeal, so "service" in showmanship need not involve, or even suggest, any actual altruism whatever. Say, rather, a good natured grasp of the customer's angle—an extrospective state of mind that spontaneously sees and states everything from the other man's viewpoint. The difference, say, between the roadside restaurant which, instead of identifying itself as "LUNCH ROOM", puts up the dynamic sign "EAT".

You remember, of course, the young Englishman who encountered for the first time in this country that delightfully specific "KEEP OUT: THIS MEANS YOU" sign.

> "Well, well," he exclaimed as he considered the matter. "That's jolly odd you know. Who could have told them I was going to do a spot of travelling way over in this bally neighborhood?"

Well, the service element in showmanship simply lifts that highly personalized "This means YOU" out of the prohibitions, and puts it into the invitations.

Now, in a hurry, the

Six Squints at Successful Showmanship

(1) IDEAS ARE BORN RIGHT OR WRONG! Showmanship at its best is often no more than felicitous phrase: "Seventh Heaven"—Sak's Fifth Avenue calls the debutante shop just built on its roof. "The Milkman's Matinee" for a radio station's 4 A.M. session.

On the other hand, infelicities as equally easy: I remember long ago a sign on Fourth Avenue "Polly Underwear: it speaks for itself". Down in Florida one of the best families spells its name "S-L-A-P-P-E-Y"; but family pride should have prevented calling its hotel "The Slappey House". Mr. Pinch, who makes trailers for automobiles was far too alert to be caught in any such trap. *He* put in the word "pleasure". So his sign reads "PINCHE'S PLEASURE TRAILERS".

(2) FIND YOURSELF A "NATURAL": The greatest danger in attempting showmanship is the almost irresistible temptation to accept its conventional, traditional symbols—often threadbare and tawdry. Take hockey, for example. Red-white-and-blue uniforms look like showmanship. The idea of recruiting a whole Chicago team among American born boys *is* showmanship.

Showmanship calls for extremes. But the *right* extremes. Doing a thing differently may be doing it worse . . . no matter how differently! It doesn't help to be different when all the others are right.

Therefore, don't let a craving for color and vehemence let you mistake a *method* for a message. A Louisville distillery, for example, borrowed a prisoner from an Indianapolis jail, dressed him up in bridal suite of a hotel and made him "King for a Day." They used large newspaper space to tie this up with "King of Kentucky" whiskey. The press agent for the film "Prisoner of Zenda" found a village in Canada named "Zenda" and airplaned them over to the opening.

These are conceits—ingenious and enterprising—but totally lacking the emotional appeal of showmanship.

(3) THINK IT BIG: Don't waste time on middle sized elephants. If you can't get a whale, get a baby minnow.

Delivered before Nineteenth Annual Convention, American Gas Association, Cleveland, Ohio, September 27-October 1, 1937.

(4) DO IT SURPASSINGLY: Sincerity in showmanship includes adequacy! Half a show is *not* better than none. It's worse! So don't feel that because you have done your best, you have done anything. Avoid particularly the easy obvious. But avoid, with equal care, all appearance of striving. In case of doubt, the best showmanship is simple, straightforward statement.

Good showmanship knows no halftones. One doesn't pull the trigger gently. Or jump half way out the window. Like smoking a cigarette on a powder keg . . . something happens . . . or it doesn't! If the idea "clicks" your showmanship will be sensational enough. If it doesn't click, no spectacularity will help.

(5) MAKE IT CRYSTAL CLEAR: Sincerity in showmanship includes also absolute clarity of meaning. To avoid ambiguity may, in fact, be the greatest function of showmanship. True meanings must explode themselves. Immediately. Unmistakably. Energetically to every mind.

Out in Great Neck, I remember, a Chinaman used to have his window lettered in three lines:

CHARLIE
HAND
LAUNDRY

I wasted years of valuable time, I believe, trying to figure out whether the *"HAND"* belonged to Charlie or the laundry.

(6) KEEP IT A GAME: The genius of showmanship expresses itself in apt and picturesque play sometimes quite unconsciously. Take the escaping Georgia negro convict, chased one night by an over-ambitious bloodhound. The Sheriff found his dog next morning safely tied to a fence with the convict's suspenders.

Don't draw your pay for being professionally less picturesque than this. Make your work interesting to people—and they will make it important for you.

By that I mean that an advertiser able to *prove* that his is the best ice-machine naturally expects a decent number of people not only to be keenly interested; but to make a reasonably self-interested move towards buying it. Surveys show that not one person in three wears or uses the article he himself regards as the best make. It takes something more than 100% merit. Only the keenest strategy will bait a good proposition with some human trifle. And even then real energy to land him.

Over and over again in my office I have warned some enthusiastic visitor that his proposition was so *good* it would probably fail. Where a patent medicine or oil well man will gather in a fortune by spending large sums frankly to promote a flagrant speculation, a hundred makers of unassailable worth, conscious of intrinsic merit, are content to state their proposition in the stark unhuman terms of its own strength. And sit around starving to death. A great showman, John Wesley's brother Charles whose gayish hymn book did much to build the Methodist church, stated the opposite and proper principle for really devout Vice Presidents-in-charge of sales. He said "I don't see why the Devil should have all the good tunes".

A Complete Purification *Service*

OUR PURIFICATION ENGINEERS have built into GPM Iron Hydroxide a dozen and a half years of specialized ingenuity and perseverance. We have *perfected* a material which is not only impressive in the laboratory but has met the iron test of diversified plant practice through the years. We have erected a *standard* for purification which makes costly experimental innovations unnecessary.

During this period, moreover, we have not only developed an oxide of unerring dependability and economy, but a *complete purification service* as well. From long and minute observation of hundreds of gas plants; by working out problems of plant practice with gas engineers on the spot, we have amassed a body of practical knowledge which is placed at the disposal of GPM users. Whether it be advice on filling the box, application of ammonia or analysis of fouled material and suggestions for reuse, the facilities of our purification laboratory and the personal services of our specialists are available without obligation.

Thus the shipment of oxide is but an incident of our complete service to the gas company, a service the value of which may be judged by the fact that GPM purifies more gas in the United States than all other oxides combined.

GAS PURIFYING MATERIALS CO. INC.

Long Island City., N. Y. & Providence, R. I.

The Association Home Planning Program

by

John F. Quinlan

A.G.A. Home Appliance Planning Bureau

WE of the American Gas Industry are about to launch a campaign for the application of gas in the nationwide home-building program. We have before us a definite market. Within the next year there will be approximately 300,000 new homes built in the United States and literally thousands modernized. Every one of these homes will require some form of equipment for cooking, water heating, refrigeration, home heating and air conditioning, laundry equipment and so forth —a substantial piece of business indeed.

It has been said by many authorities, government and otherwise, that our country is short today over 2 million homes and, considering the annual increase in our population, something must be done to provide shelter for the people of the nation. By shelter I mean houses which will give us the high standard of living which is available at the present time —well within the reach of the purse strings of all of us. It is the rich opportunity of the gas industry to do its part in providing this higher standard of living.

Houses between six and ten thousand dollars will be the great market in the future. Hundreds of millions of dollars have been expended by the Government during the past few years in the effort to stimulate interest in housing. Yet the market has been merely scratched;—there is a mighty amount of work to be done if we are to accomplish the objectives which thousands of builders and architects have been thinking about—dreaming about and working for.

"I cannot stress too strongly the fact that nowhere is there available for the architect, the builder, or others interested complete information about gas appliances which will enable the architectural profession and the building trades to apply such equipment to homes. In the recent program launched in the electrical field, ten thousand architects and one thousand builders were supplied with an appropriate file covering every phase of home electrification. This file cost in the neighborhood of $50,000 and today it is on the desk of practically every architect in the United States."

In addition to new housing, we have millions of homes at the present time which are out of date but may become up-to-date through the use of gas appliances. The replacement market, therefore, as well as the new house market is of tremendous importance to our industry and this is exactly what we are going after. This is the major purpose of our Home Appliance Planning Bureau. The business is awaiting us and we are determined to get our share.

Our first contact should be with the architectural profession in the form of a nationwide architectural contest with attractive cash prizes for winning designs, and so forth. For this purpose, and in order to obtain the best program which could be devised, we called in separately the editors of the four major architectural papers—gave each magazine one month to prepare a program which it felt we should carry out—and then, in turn, gave each magazine an opportunity to present its own program to a group of our executives.

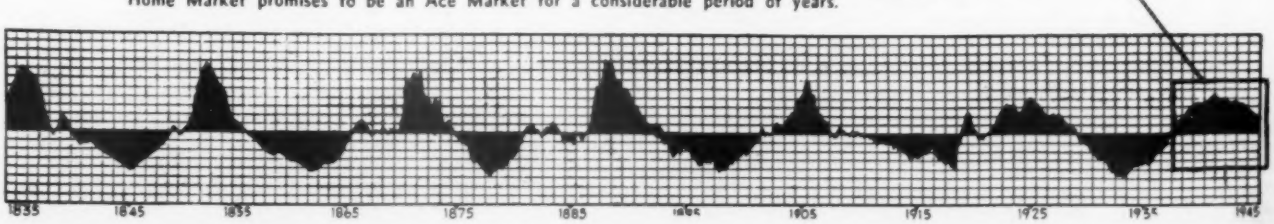
The result was that the *Architectural Forum* was selected as the sponsor.

The architectural contest of the program will serve to educate the architect regarding up-to-date gas appliances. It will serve also to place in each architect's and designer's hands the complete story or catalog

Abstract of paper presented at Commercial Section A.G.A. Convention, Sept. 27-30, 1937.

WHAT IS THE DOMESTIC MARKET OUTLOOK?

All authorities agree that the Domestic Market (both new and replacement) is headed for a sustained period of activity. The last black area on the chart is an attempt to predict the approximate extent and duration of the next building boom, based on the pattern established during the past hundred years. The Home Market promises to be an Ace Market for a considerable period of years.



of our major appliances. It requires them to actually indicate such appliances in designs for up-to-date homes.

Our architectural advertising has been spotty and not sufficient properly to educate the profession and to carry the load. One of the features of this program is that it will provide in a short time the necessary information on all phases of gas installations. In this connection you will realize that we must depend upon the fullest cooperation of the appliance manufacturers to support this very important phase of the program. With their assistance and active participation this essential information will be available.

Our Association has appropriated a large sum of money to carry on the work of the program during the next fiscal year and this advertising feature is one of the very few tasks which we ask the appliance manufacturers to undertake. This can be done at very small cost to each manufacturer. We have considered it would be advisable to apply the cost in this way rather than to ask for a lump sum from the manufacturers.

What Factors Control The Domestic Gas Market?

The Consumer
The Architect
The Builder
The Plumbing and Heating Contractor
The Mortgage Banker
Property Owners and Managers—
and equally important, the utility representative and dealers who have to sell the gas idea.

Part of the program which features the builders contest will provide us with a number of completely gas equipped homes. Builders will be required under the rules of our program to maintain these homes for local demonstration so as to provide an opportunity for local demonstration. This will provide an opportunity for hundreds of thousands of people to see the latest and best service and equipment which the industry offers. Also, it is our plan to organize the country through the medium of all of our operating companies and others interested with a view to establishing hundreds of additional homes for demonstration purposes. Appropriate literature will be sent to all member companies by January 1st outlining the procedure

4 Parts—1 Program

The proposed program has 4 major divisions, each complete in itself but all definitely related. If the program is to be fully effective, it should be treated as a unified campaign. And to give the program unity and direction, it must have a sustained theme and sustained objectives.

for organizing this additional feature.

It will be suggested that local committees be formed in all important cities where we have gas properties —each committee to be composed of the leading local factors interested in the construction and furnishing of homes. A representative of the local gas company should be selected in each instance to head up such a committee and he will be responsible for approaching local builders and their architects in a plan to have these homes constructed, equipped and demonstrated.

Such homes will provide the best possible demonstration showrooms for our operating companies and our appliance manufacturers. Appropriate literature for organizing this additional feature of the 1938 program will be available in due course.

It is important that some individual be appointed in your own organization to carry out the details of the program as outlined. A local representative committee should be appointed and the personnel of this committee should report to Headquarters with the name of its chairman. We, in turn, will correspond from then on with the chairman in each instance.

Suitable guides for local newspaper campaigns and appropriate articles for local publication covering all phases of gas installations will be sent free of charge from A.G.A. Headquarters. We should have a suitable tie-in also in our nationwide architectural and home builders contests. Both the utility and manufacturing companies should see to it that

appropriate information is given locally to architects and builders. Our present national advertising program will support our program from a nationwide standpoint and the program will also be liberally supported by the leading home magazines editorially.

Our staff at Association Headquarters in New York will do everything in our power to assist you locally and nationally.

With a great industry such as ours, with hundreds of millions of dollars invested in its properties and equipment, serving over half the population of the United States, the time has come when we must necessarily assume the offensive. We have every fundamental appliance for home comfort, such as kitchen equipment, heating equipment, laundry and water heating equipment.

A great General on the Western front said at one time during the World War, "My center is stove in, my flanks are weakening, but I am attacking." This attack was made in the face of one of the mightiest forces ever gathered together in the history of mankind. We all know the result.

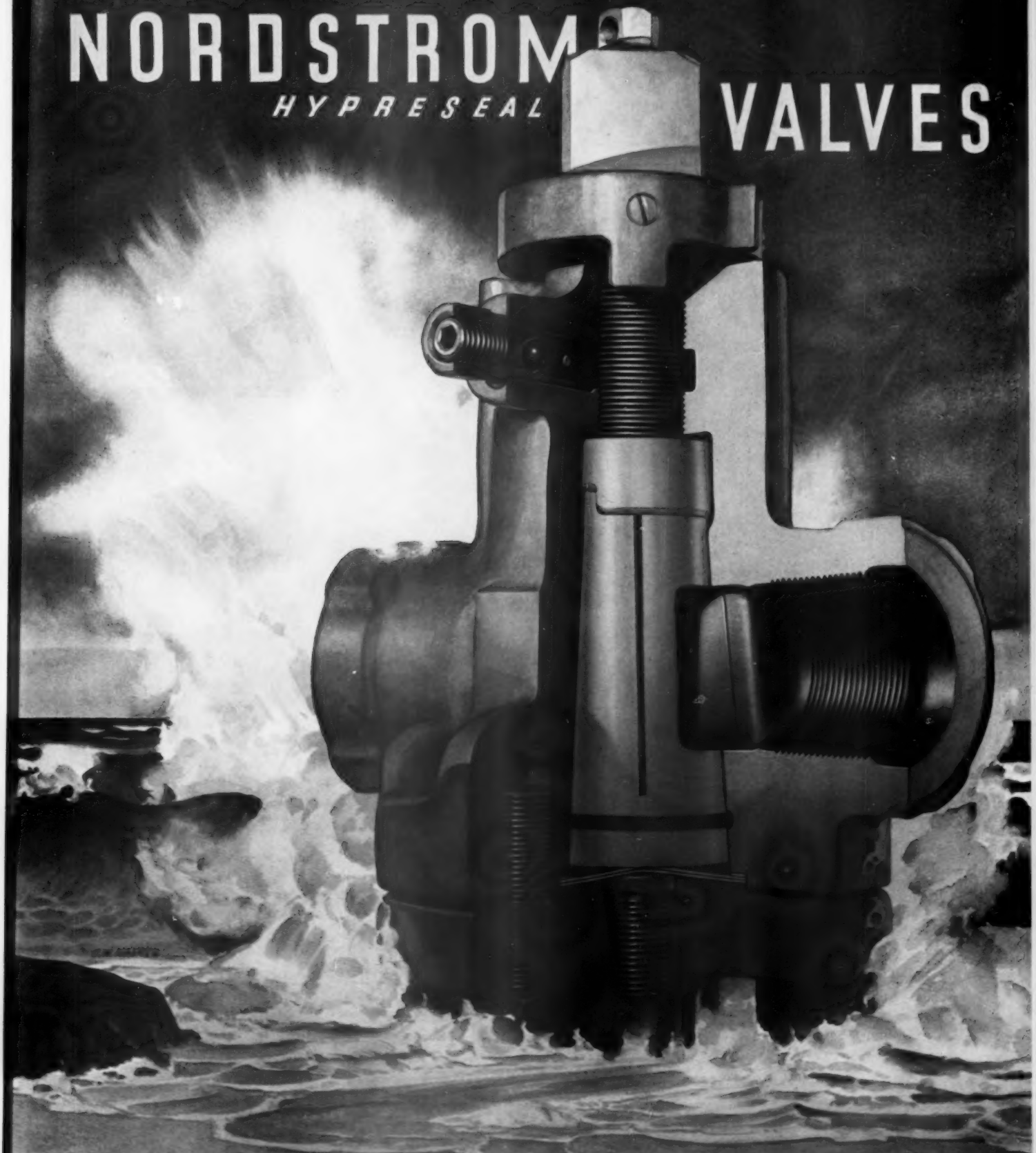
Let us assume the offensive,—we have the necessary materials, ammunition and intelligent men to do so. This offensive will call for the active, full support of every man in our great army from coast to coast. There will be no falling back. We must marshall the full strength of our forces—advance and carry the banner of more and better gas service into every home in the land.

The 4 Stages of the Program

1. Home Owner contest for photographs of gas equipped kitchens, gas equipped basements and all gas homes.
2. Architectural contest stressing the theme—Use Gas For all 4—Cooking, Hot Water, Heating and Conditioning, Refrigeration.
3. Builder contest.
4. The 1939 New York World's Fair.

"The Objectives:—To resist further inroads into the present gas market and to increase gas consumption through increased use of gas fired equipment."

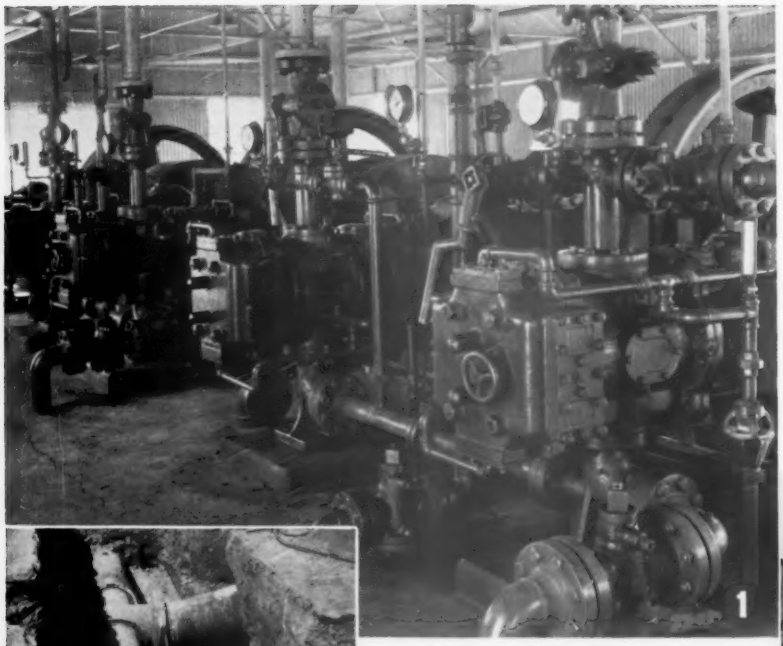
NORDSTROM HYPRESEAL VALVES



WITH THE CERTAINTY OF THE TIDE

The Nordstrom Hypreseal Valve has already made great strides in handling extreme pressures and temperatures, in the Gas, Petroleum and Chemical Industries. More and more the Hypreseal is becoming the preference; its universal acceptance is a certainty. The impervious seal, in combination with "Sealdport" lubrication, gives to this valve unusual characteristics that guarantee highly satisfactory performance.

PERFECT APPLICATION OF A PRINCIPLE



SAFETY
in gas handling *demands* leak-proof valves

Nordstrom Valves are the surest insurance against leaks. Patented "Sealdport" lubrication seals the plug against all leakage, regardless of line pressure.

1. Nordstrom Hypreseal Valves on heavy-duty gas compressors on outlet lines, assure tight seal.
2. Nordstrom Hypreseal Valves on gas-trap.
3. Nordstrom iron valve on low-pressure city distribution line.
4. Nordstrom Valves on large natural gas transmission line.

½" to 30"
(ABOVE)
Largest plug valve ever built.
(AT LEFT)
Nordstrom Curb and Meter Cock.

MERCO NORDSTROM VALVE CO. *A Subsidiary of* **PITTSBURGH EQUITABLE METER CO.**

Main Offices: Pittsburgh, Pa. *Branch Offices:* New York City, Buffalo, Philadelphia, Columbia, Memphis, Atlanta, Chicago, Kansas City, Tulsa, Houston, Los Angeles, Oakland. *Canadian Representatives and Licensees:* Peacock Brothers, Ltd., University Tower Building, Montreal, Quebec.

NORDSTROM VALVES

LUBRICATED PLUG

PATENTED "SEALDPORT" LUBRICATION

A Review of the Principles of Gas Scrubbing

By
C. C. Furnas
Associate Professor of Chemical Engineering,
Yale University, New Haven, Conn.

"SCRUBBING" seems to be a general term referring to the process of the removal of a foreign substance by vigorously contacting it with a liquid, usually water. It is an operation frequently encountered in early childhood. In the gas industry "scrubbing" may refer to a number of things: it may be the removal of dust from blast furnace gas by a water spray or it may be the elimination of H_2S by a soda ash solution from manufactured gas. This paper will confine itself to a discussion of underlying principles of that kind of scrubbing where certain gaseous constitutents are removed from the main gas phase and transferred either by chemical reaction or physical absorption to a liquid. Almost every chemical industry utilizes this operation or some of its modifications.

The first requisite of a successful scrubbing process is that the equilibrium conditions must be correct; that is, the constitutent to be removed from the gas must be highly soluble in the liquid used and the other constituents of the gas must be highly insoluble. Whether the solubilty is due to a physical absorption of a chemical combination is of minor importance; it is the equilibrium conditions that determine the operation. In a liquid purification system where H_2S is removed by soda ash solution the sulfide gases are very soluble in the liquid but the CO and H_2 of the gas are soluble only to a negligible extent. Hence if the gas is brought in adequate contact with the solution, the H_2S will rush into the liquid leaving the other gaseous constituents behind. Moreover, after the sulfide gas gets into the liquid it shows but small tendency to come back out, that it, its partial pressure over the solution is very low until a relatively high concentration has been built up. This low back pressure of the absorbed gas is generally characteristic of very soluble gases, such as ammonia or water vapor in sulfuric acid solutions, carbon dioxide in soda ash, or benzene in oil.

If equilibrium conditions are right the problem of scrubbing then becomes one of providing sufficient opportunity for contact between the gas and liquid phases.

Whenever there is a transfer of material from one phase to another there must necessarily be some sort of driving force to send the material along its way. Everyone is familiar with the concept that heat flows from a given temperature to one which is lower. The temperature difference is the driving force of heat transfer. The analogous driving force in gas absorption is the partial pressure of the constituent being absorbed. As long as the partial pressure of material in the gas phase is greater than the partial pressure of that same constituent over the solution or liquid absorption will take place, and usually the *rate* of absorption is directly proportional to this difference in the partial pressure between the two phases. Obviously the amount of material transferred between the gas and the liquid in a given time will also be proportional to the extent of the interfacial area between the phases. It is also self-evident that if material is being transferred from the gas to the liquid at any finite rate there is some sort of a resistance to this transfer. The magnitude of this resistance depends upon the chemical and physical character of the system and can only be determined by experiment. This is the item which has received most of the attention of the researchers.

These ideas of the controlling factors of gas absorption are summarized by the simple general equation,

$$\frac{w}{\theta} = k\,A\,\triangle\,P_m$$

where w/θ = mass of material transferred from gas to liquid in a unit of time.

k = coefficient of transfer commonly measured in lb. of material transferred per hour per atmosphere partial pressure difference. (This is the reciprocal of the resistance to transfer.)

$\triangle P_m$ = average or mean partial pressure difference (usually measured in atmospheres) of the material being transferred, in the gas and liquid phases.

A = the amount of area of interfacial contact of the two phases.

This equation, which is exactly analogous to the one used for heat transfer is perfacely general. Any set of units may be used, as long as they are consistent throughout. The evaluation of $\triangle P_m$, the *average* partial pressure difference, is subject to considerable variation in interpretation and will be discussed later.

By inspecting this equation it can be seen that when a constituent is being transferred to a liquid at a rapid rate it may be because (1) the transfer area is large, (2) the partial pressure difference between the phase is great, or (3) resistance to transfer is low, i.e., the reciprocal of resistance, the transfer coefficient, k, is large; or it may be due to any combination of these factors.

To have a complete understanding of either the design or the operation of gas absorbing equipment it is necessary to go a little more deeply into the make-up of the resistance to transfer. Again it will be advantageous to draw upon the analogy to heat transfer. When a hot liquid moves through a metal tube made of some highly conductive material such as copper, the resistance to heat transfer does not reside in the metal wall but in a thin film of liquid clinging to the metal surface. The thickness of this film can be cut down by increasing the rate of liquid travel, so increasing the liquid flow increases the rate of heat transfer, usually as about

Presented before the Technical Section, American Gas Assn., Cleveland, Sept. 29th, 1937.

the 0.8 power of the liquid velocity. Likewise, when a liquid and gas are in contact and a constituent is being transferred, there is a stagnant film of gas next the liquid which offers resistance to the movement of material through it. Returning to the heat transfer analogy; if there is a thin-walled double-pipe heat exchange with a hot fluid on one side of the central tube and a cold liquid on the other, there are two films in series which offer resistance and through which heat must be transferred. Decreasing the resistance of one film by increasing its velocity then has no effect upon the resistance of the film on the other side of the wall, though the *overall* resistance to transfer through both films may be decreased by decreasing the resistance of one. The film and temperature gradient conditions of this set-up are shown as the cross-section of a double-pipe exchange in Figure 1.

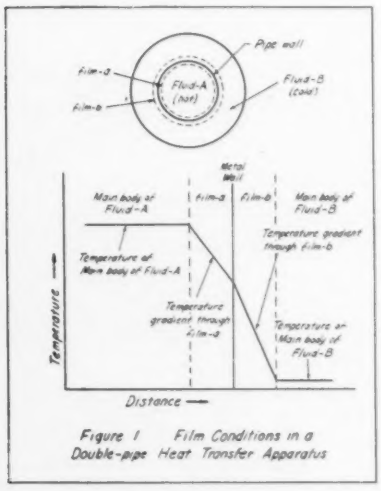


Figure 1 Film Conditions in a Double-pipe Heat Transfer Apparatus

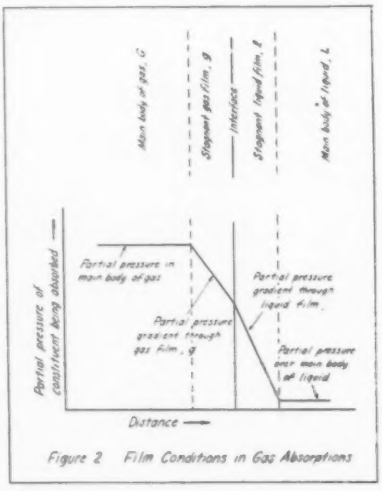

Main body of gas, G
Stagnant gas film, g
Interface
Stagnant liquid film, l
Main body of liquid, L
Partial pressure of constituent being absorbed
Partial pressure in main body of gas
Partial pressure gradient through gas film, g
Partial pressure gradient through liquid film.
Partial pressure over main body of liquid
Distance

Figure 2 Film Conditions in Gas Absorptions

The film conditions in gas absorption are exactly analogous to those of the double-pipe heat transfer equipment. In place of the thin metal pipe wall there is the infinitesimally thin interface between the gas and liquid phases. On the gas side of the interface there is a stagnant film of gas which resists the transfer of material and on the liquid side of the interface there is a stagnant film of liquid which resists the transfer of material. The film conditions and partial pressure gradients through such a system are shown in Figure 2.

It often happens in both heat exchangers and gas absorbers that the resistance of one of the films is negligible. When this is true the considerations are greatly simplified. For instance, in Figure 1, if the hot fluid is condensing steam and the cold fluid a viscous oil then the heat transfer coeffcient on the steam side will be so high that it will be negligible and practically all of the resistance and hence all the temperature gradient will be in the oil film and the apparatus can be considered as having only a single resisting film. Similarly in gas absorption where there is a very soluble gas, there is often a negligible resistance in the liquid film, so nearly all the resistance resides in the gas film. This is approximately true for the absorption of ammonia in water. Since H_2S and CO_2 are highly soluble in soda ash solutions, it might be expected that these would be cases where practically all the resistance is in the gas film. However, this supposition has been shown to be untrue, for the absorption in the liquid phase is by means of a relatively slow chemical reaction, the formation of the bicarbonate, and a good part of the resistance thus resides in the liquid phase. This is shown by the data of Figure 3 which are the results of a test run on the absorber of the liquid purification plant of the Connecticut Coke Company. The active volume of the grid-packed tower was 20,500 cubic feet, the grid surface, 118,000 square feet. It will be seen that the rate of liquor flow had considerable effect on the overall coefficient of transfer, and particularly at the higher liquor rate, the gas flow also had a pronounced effect. This shows that both liquid and gas films are important in this transfer. These data are not sufficiently complete or reproducible to permit the calculation of the individual transfer coefficient. However, where satisfactory data are available the transfer coefficients k_g and k_l of the gas and liquid films respectively, can be computed from

$$\frac{1}{k_o} = \frac{1}{k_g} + \frac{1}{k_l} \qquad (2)$$

the general relation, where k_o = the overall transfer coefficient as determined in the apparatus.

The coefficients of transfer are computed from data to flow quantities and analysis of the entrance and exit fluids. Since the operation is considered as analogous to heat transfer it is necessary to use the logarithmic mean for the determination of the average partial pressure difference between the phases.

The logarithmic mean is defined as:

$$\Delta P_m = \frac{\Delta P_1 - \Delta P_2}{2.3 \log_{10} \frac{\Delta P_1}{\Delta P_2}} \qquad (3)$$

where ΔP_1 and ΔP_2 refer to the partial pressure differences between the two phases at opposite ends of the apparatus. The partial pressure

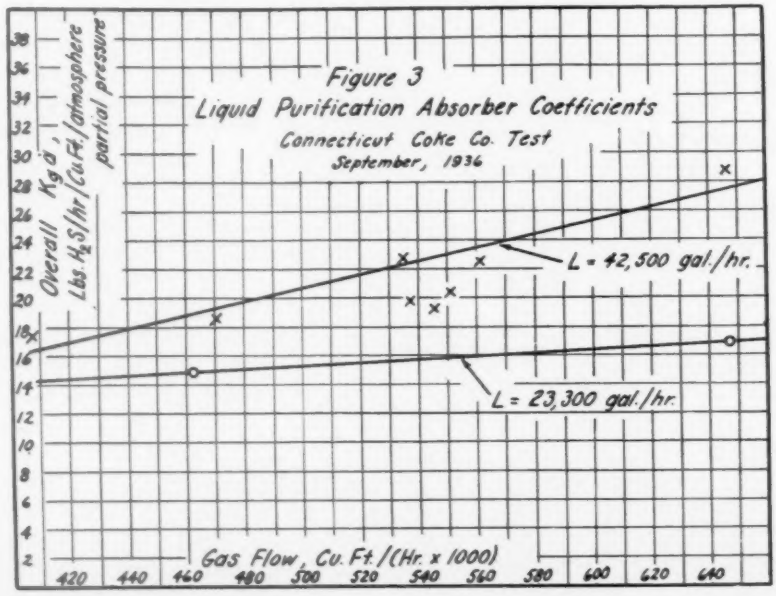


Figure 3
Liquid Purification Absorber Coefficients
Connecticut Coke Co. Test
September, 1936
Overall $K_g a$, Lbs. H_2S/hr./Cu.Ft./atmosphere partial pressure
L = 42,500 gal./hr.
L = 23,300 gal./hr.
Gas Flow, Cu. Ft./(Hr. x 1000)
420 440 460 480 500 520 540 560 580 600 620 640
38 36 34 32 30 28 26 24 22 20 18 16 14 12 10 8 6 4 2

over the liquid can usually be determined by analyzing a sample of gas over a sample of liquid which has been vigorously shaken in a bottle.

The utility of these absorption coefficients lies in transferring experience from one operation to another. If coefficients are determined for pilot plant equipment with a given packing they can be used to compute the size of large apparatus necessary to do a given job of transferring with given terminal conditions. Using equation (1), they can be used to determine beforehand the effect of a change in the rate of through-put of either phase, if the effect of rate of flow upon the coefficient is known from experiment. For instance, if it is known that the resistance to transfer for a given system is all in the liquid film, it will be known that increasing or decreasing the rate of gas flow will have a negligible effect on the amount of material absorbed. However, the amount absorbed will be markedly affected by the liquid flow. Usually the coefficient varies about as the 0.8 power of the velocity, so if the liquid flow through the apparatus were doubled the coefficient would increase about 75 per cent. Then if terminal concentration conditions were kept the same as before, the amount absorbed per unit of time would be increased by about 75 per cent.

Stripping

The principles of stripping or desorption are the same as those of absorption except the process is in the reverse direction, the material leaves the liquid phase and passes into the gas. There are two ways of bringing this about. In the liquid purification system for removing H_2S, the soda ash foul solution containing H_2S is passed down a packed tower countercurrent to a stream of air. The partial pressure of H_2S in the air is less than that over the solution so the H_2S passes out of the liquid into the air. The coefficient of desorption in this case is about the same as for absorption. The other method of stripping is to raise the temperature of the liquid and thus raise the partial pressure of the material to be stripped out. This is exemplified by the removal of benzene by blowing steam through a scrubbing oil; the steam raises the temperature and also acts as a carrier gas to take the benzene away but the principles are the same in either case, the substance moves out the liquid because its partial pressure there is higher than in the gas phase. The coefficients of desorption are measurable and can be used to compute performance.

Polymerization: What It Means to the Gas Industry

by

J. S. Carey* and F. E. Frey**

Gas polymerization, or the conversion of hydrocarbon gas into gasoline, made its bow to the petroleum industry less than three years ago. The economic soundness of polymerization has been demonstrated and plants to produce altogether over 25,000 barrels per day of high octane number gasoline are now in operation or under construction.

To the petroleum industry gas polymerization means more gasoline from field gas and more from refinery gas, and so from this overall view, more from the crude. Polymerization is thus not only a method of producing motor fuel but a further step in the direction of conversation.

One of the potentialties of polymerization is that it creates a new definition of crude oil since in essence natural gas constituents become raw material for the manufacture of motor fuel. This viewpoint may ultimately have a decided influence in the search for new supplies of petroleum. Whereas, today incidental gas reserves are more or less of a nuisance in the search for crude oil, the values created by polymerization may suffice to make such petroleum reservoirs of definite economic value.

Perhaps the most important factor to be considered is the time factor. In an economic situation where so many permutations of place and form utilities require detailed appraisal, where large investments are required and where technological advances may be expected it is reasonable to assume that at least a decade will be taken in the full development of the potentialities. A close analogy is to be found in the petroleum industry in the history of oil cracking which was first heard of commercially about 1918, but which has only recently approached complete application to our supplies of petroleum. On this basis the effects of polymerization, no matter how far reaching, will be gradually felt with plenty of time for such economic readjustments as become necessary.

The next question is, of course, what does polymerization mean to the gas industry? Since gas polymerization and, for that matter, the whole field of motor fuel production are in a state of active evolution, any attempt to see more than a few years ahead must be largely speculative. The gas industry is destined to feel the effect of these developments to some degree. One significant point might first of all be mentioned. Methane, the lightest of the gaseous hydrocarbons, is the most abundant one occurring in natural gas, representing on the average about 60 per cent of the calorific value, and methane has seemingly proven thus far to be difficult and relatively expensive to convert into gasoline. Hence, there seems to be no immediate prospect that the major part of the natural gas produced for distribution, represented by methane, need be considered in connection with polymerization. All the other and heavier gaseous hydrocarbons occur in natural gas as minor constituents and all can be polymerized —this includes the ethane, propane and butane occurring in natural gases, and occurring together with unsaturated gaseous hydrocarbons in refinery gases. Coal gas contains but a small amount of these polymerizable hydrocarbons.

The role to be played by gas polymerization is determined by many factors. Natural gas is the most important potential source of hydrocarbons for polymerization from the standpoint of volume and it is at this point perhaps that polymerization touches the gas industry most closely.

Refinery gas is also a source of gaseous hydrocarbons suitable for polymerization. The volume of gasoline obtainable from refinery gases is impressive.

Altogether, natural and refinery gas could conceivably yield a volume of polymer gasoline equal to over one-third the present gasoline volume marketed in the United States, but the factors which stand in the way

* The M. W. Kellogg Co.
** Phillips Petroleum Co.

Abstract of paper presented before the Technical Section, A.G.A., Cleveland, Sept. 29th, 1937.

of so exhaustive an application of polymerization are many.

Exhaustive extraction plus 100 per cent efficient polymerization represent the extreme case, which may be illustrated by the following speculative example. In the table is given the composition of "average" natural gas, based on analyses of gas samples from a large number of localities.

Gasoline Potentialities of "Average" Natural Gas

	Gas Volume Per Cent	Weight Per Cent	Calorific Value, %	Barrels Gasoline/ MM cu.ft. Nat. Gas*
Methane	80.0	59.8	61.6	—
Ethane	10.0	14.0	13.6	29.4
Propane	5.5	11.3	10.8	24.2
Butane	2.5	6.8	6.4	14.7
Pentanes plus	2.0	8.1	7.6	19.3**
Total	100.0	100.0	100.0	87.6

** If converted into octylene type gasoline with a conversion efficiency of 100%.*
*** Ordinary extraction, natural gasoline.*

Large volumes of gas, brought together by field lines for pipe line transmission, can be subjected to extraction with comparative economy to give favorably large volumes of polymerization stock, and an added economy can be realized when the high pressure required for pipe line transmission can be taken advantage of to cheapen the extraction. A further advantage is gained where a gas company can treat wet gas to recover both natural gasoline and conversion stock in the same plant.

The effect of such extraction on the characteristics of the gas which then passes to the pipe line can be illustrated by considering a lean gas resembling gas from the Amarillo field in composition with natural gasoline extracted. All the butane and 90 per cent of the propane are recovered for polymerization charge. The tail gas, chiefly methane, produced in polymerization is considered to be returned to the gas which more than offsets in volume the volume loss due to extraction, 1000 cubic feet of inlet gas yielding 1015 cubic feet of residual gas, or an increase of 1.5 per cent. A small amount of gas is required as fuel for the polymerization process. The calorific value is reduced from 1153 B.T.U. to 1075, and the specific gravity from 0.64 to 0.59.

Gas polymerization seems destined to play a distinctly limited role for some time to come in the larger field of natural gas utilization. Propane and butane, on the other hand, since they constitute satisfactory conversion stocks in themselves, bring to a focus the question of direct utilization as liquefied petroleum gas versus polymerization to gasoline. Many factors will differ from one situation to another and make any blanket comparison of the value of butane as fuel and as polymerization stock misleading. The fuel value considered at the source, may range so widely that it can be safely said that there is a place for each. For many applications, both industrial and domestic, propane and butane can be expected to continue to be worth more than their polymerization value.

Future developments can be expected to increase the values created by polymerization for convertible gaseous hydrocarbons and to broaden the versatility of polymerization as a source of motor fuels to meet exacting requirements.

Specifications for the Installation of Bell Joint Clamps

Introduction

The Subcommittee on Pipe Joint Research in 1933 issued specifications for bell joint clamps under the title, "Tentative A.G.A. Requirements for Bell Joint Clamps." Several manufacturers of clamps had their products tested in accordance with these Tentative Requirements at the A.G.A. Laboratory. As a result there is now available on the market clamps of suitable design and construction to adequately meet most of the clamping problems encountered.

There are instances, however, where clamps of a type that meet A.G.A. requirements fail in service and the reason for these failures can usually be attributed to improper installation of these clamps. These instances of failure in service suggested to this subcommittee the desirability of formulating general specifications covering the installation of clamps.

It was realized that detailed installation specifications might vary considerably with the type of clamp encountered. On the other hand since the purpose of all bell joint clamps is to stop leakage at bell and spigot joints, it was believed that there should be many points in common in the procedures employed for installing the various clamps. This subcommittee, therefore, contacted the manufacturers of clamps and some twenty distribution engineers, requesting that they submit their specifications for the installation of clamps. The response to this request was excellent and a great deal of interest in this subject was indicated by the replies.

In accordance with expectations considerable variation in opinion was expressed in the replies received. The following detailed specifications for the installation of bell joint clamps in most instances represent the majority opinion of manufacturers and distribution engineers contacted.

(Appendix to Report of Subcommittee on "Pipe Joints and Pipe Materials", L. W. Tuttle, Chairman, being part of the Distribution Committee Report.)

Lead Joints

I. Preparation of the Joint

A. Recaulking and Refacing

The joint to be clamped shall be recaulked to stop the leak and to condition the joint for the installation of the clamp. If after recaulking:

1. The lead extends beyond the face of the bell, the lead shall be cut off smoothly and flush with the bell face, or if
2. The lead is recessed more than about ⅛", the joint shall be refaced smoothly approximately

flush with the face of the bell with one of the following:

(a) Lead wool.
(b) Cast lead.
(c) Neat cement.
(d) Plaster of paris.

If lead wool or cast lead is used for refacing the joint, the lead in the joint should be cut out to a depth of about ½" to allow proper reception of the lead facing material. If, however, neat cement or plaster of paris is employed for refacing, it is not necessary to cut out the lead to a ½" recess. Clamps should be applied to joints refaced with cement or plaster of paris before these materials have taken on initial set.

Comments: A majority of the companies contacted favored recaulking the joint to stop the leak. It was believed that this stopping of the leak is additional protection against the joint leaking and that the additional expense of caulking is warranted.

Some companies advocate the installation of the clamp on a leaking joint providing, of course, that the joint is otherwise suitable for the installation of the clamp, on the theory that it is possible to determine if the clamp has stopped the leak. One company drives a nail through the lead to make the joint leak. Also the stopping of the leak by the clamp is sometimes used as a guide to the proper tension on the bolts. One company, however, submitted test data that indicated that some clamps will seal a joint against 5 lbs. pressure with a torque on the wrench of only 15 ft. lbs., and further that only 25 ft. lbs. of torque on the wrench was required to stop a leak against 30 lbs. main pressure. Since the torque is considerably less than recommended for proper bolt tension, it is evident that the stopping of the leak by the clamp should not in itself be used as evidence of the proper installation of the clamps.

The amount of recess permitted without refacing, of course varies with the type of clamps. Some companies allow a maximum recess of 1/16" while in some instances a recess of ⅜" to ½" was considered satisfactory.

B. Cleaning the Joint

The back of the bell in contact with the anchor ring shall be thoroughly cleaned of all dirt, scale, and projections that might cause the anchor ring to seat improperly.

The face of the bell and the surface of the spigot in contact with the gasket and follower ring shall be thoroughly cleaned of all dirt, rust, scale, and other foreign materials down to bright metal. This cleaning may be accomplished by power brushing, power scaling, sand blasting, chipping, wire brushing, or other suitable means to thoroughly clean the surfaces. After mechanical cleaning the face of the bell and surface of the spigot shall be thoroughly washed with soap and water.

If the joint is refaced after the cleaning operations, care must be exercised to remove any strands of lead or particles of cement or plaster of paris adhering to the surfaces of the bell and spigot.

II. Gasket

A. Length

The length of the gasket for each joint shall be determined by wrapping the gasket around the spigot, pulling it up snugly and marking the over-lapping end for cutting. Since there is considerable friction between rubber and iron, the pipe and the gasket should be lubricated before the measurement is taken, especially for the larger pipe sizes.

B. Cutting Gasket

The gasket shall be cut parallel to the original cut by means of a hack saw or a thin knife dipped in water. To insure that the ends of the gasket splice are parallel a mitre box may be used.

C. Making Splice

The method of drawing the ends of the gasket together and maintaining a splice depends somewhat on the character of the clamp. For some gaskets, thin tongs may be used to bring the ends together. The ends may be spliced by means of locks, nails, staples, or rubber cement.

D. Gasket Lubricant

The lubricant used for the gasket and surfaces of the joint in contact with the gasket shall be liquid soap, soap water, or glycerine (and water).

Comments: Two manufacturers of clamps and two operating companies recommended that the gasket be cut somewhat short. It appears that this suggestion has a great deal of merit, especially for gaskets for large diameter pipe. There is an old trick problem that illustrates the merit of cutting gaskets short. The problem is, "Assume that a steel band surrounds the earth at the equator. If this band is cut and a three (3) foot piece is spliced in, how much clearance will there be between the steel band and the earth (all the way around). The answer that there will be approximately 6" clearance between the steel band and the earth at every point seems absurd, but yet it is mathematically correct. Similarly if the gasket for a clamp is cut ⅛" too long the mathematically determined clearance between the gasket and the clamp will be $\frac{1}{2}\frac{.125}{\pi}$ or approximately .02 inch. Now since rubber is incompressible, there must necessarily be an increase in cross section of the gasket if there is to be a gas tight contact between the gasket and the spigot. However, the making up of the joint with pressure of the gasket against the bell tends to resist an increase in cross sectional area of the gasket, and restricts the pressure of the gasket against the spigot.

If on the other hand the gasket is cut slightly short, the ends can be pulled together stretching the gasket slightly and insuring the proper uniform contact on the spigot. This condition is similar to that found in the installation of a mechanical joint, wherein the gasket must be stretched to get it over the end of the pipe.

Nearly all the companies used soap or glycerine for a lubricant. However, some companies use linoleum cement, oil, and one company uses paint.

III. Assembly and Installation of Clamp

A. Tolerance of Dimensions of Clamp and Pipe

A clamp shall be selected, or if adjustable, adjusted, such that there is a minimum of clearance between the follower ring and the spigot so that there will be no extrusion of gasket between the ring and the spigot.

B. Assembly

The detailed method of assembly of the clamp varies with the size and type of clamp. After assembly of the anchor ring and follower ring, and with the properly lubricated gasket in place, the bolts shall be inserted from the anchor ring to the follower ring and the nuts turned on hand tight. The proper uniform bolt tension shall be secured by the process of drawing up diametrically opposite nuts a few turns at a time.

As soon as the bolts are under initial tension the rings shall be hammered to properly seat them.

C. Bolt Tension

The proper tension on the bolts, usually expressed in ft. lbs. torque on a wrench, varies with the size and make of clamp used. Manufacturers' recommendations should be followed. Care shall be taken not to over stress the bolts or warp the follower ring of the clamp.

Comments: Nearly all companies contacted insist that the follower ring fit as closely to the spigot as possible

(Continued on page 71)

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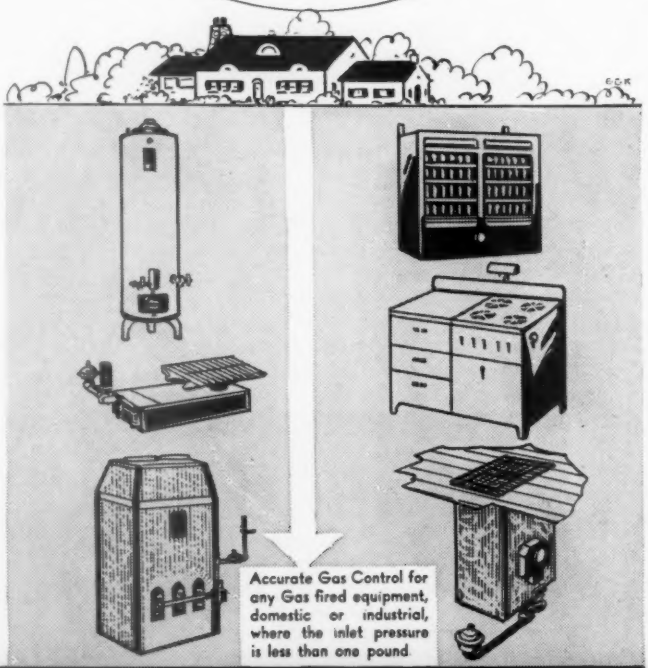
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REYNOLDS GAS REGULATOR COMPANY

ANDERSON, INDIANA, U. S. A.

The Freezing of Regulators and Its Prevention

M. A. Hardie, Jr.
The Montana Power Company,
Butte, Montana

It is common experience, probably to the majority of those men in the mid-continent assigned the responsibility of operation of pressure reduction equipment, that freezing has occurred when the gas temperatures were appreciably above 32° F. Since water forms ice at 32°—and the variation of the freezing point by virtue of application of pressure is so slight as to be not pertinent to the discussion—then it is self-evident that the concern is not with ice of the common sort. It is true that the amorphous, translucent, white solid that is found in frozen regulators looks like ice, and upon melting produces water and that the temperature of the mass melting under atmospheric pressure will be 32°; however, a slight ebullition may be noted in melting, and moreover, the gas so given off is inflammable. This material has been entitled, "hydrates of natural gas," by virtue of the fact that one molecule of a hydrocarbon in the gas unites with six or seven molecules of water to form what will be hexa- or hepta-hydrates respectively.

The conditions under which hydrates will form are: First, there must be liquid water present; second, a nucleus must be present around which the material can grow; third, the pressure must be sufficiently high or the temperature sufficiently low to permit growth. High velocities and turbulence will aggravate the accumulation. Experience has fostered the belief that all natural gases as produced are saturated with water vapor to the temperature and pressure of production. Later in the paper, methods will be delineated by which this water vapor may be transposed into its liquid state. The necessary nuclei, which may be a particle of scale or dirt, would naturally abound in any regulator body. The latter discussion of regulator types will have reference to high velocities, friction, and turbulence.

Figure 1 is a curve showing the melting points of hydrates from Cut Bank gas at various pressures. It might be noted that the curve shown does not vary greatly from, and is parallel to, the curve of Hammerschmidt which gives rise to the suggestion that the curve is general for normal natural gases; likewise, it is possible that other hydrate curves will be parallel.

The prevention of hydrate formation in regulators may be accomplished by either of two major or a third minor course. It is self-evident that if no liquid water were present or if such water as was present was suitably inhibited that no hydrates would form. Secondly, it goes without saying that should the temperature of the gas be above the hydrate point, no hydrates would form. Thirdly, if the regulator were so constructed that the temperatures reached by virtue of expansion were sufficiently small as to maintain the gas temperature above the hydrate point, no difficulties would ensue.

It is barely conceivable that a system of dehydration should be installed for the sole benefit of the prevention of the formation of hydrates in pressure control devices. Nonetheless, the additional advantage of uninterrupted operation of regulators might be the deciding factor in such a project when continuous transmission line operation and mitigation of internal corrosion would not suffice.

The dehydration of gases may be effected by absorption, adsorption, compression, or refrigeration. For the purpose of preventing freezing in regulators, only the two first-mentioned schemes are applicable, inasmuch as it would be quite fantastic to conceive of a refrigeration system, much less a compression system, to increase the pressure of the gas to condense out moisture which in turn would create more work for the regulator to do.

The Montana Power Company uses anhydrous flake calcium chloride for drying gas at the well head. It might be here stated that the dehydration system was not initiated for the sole benefit of the regulators but

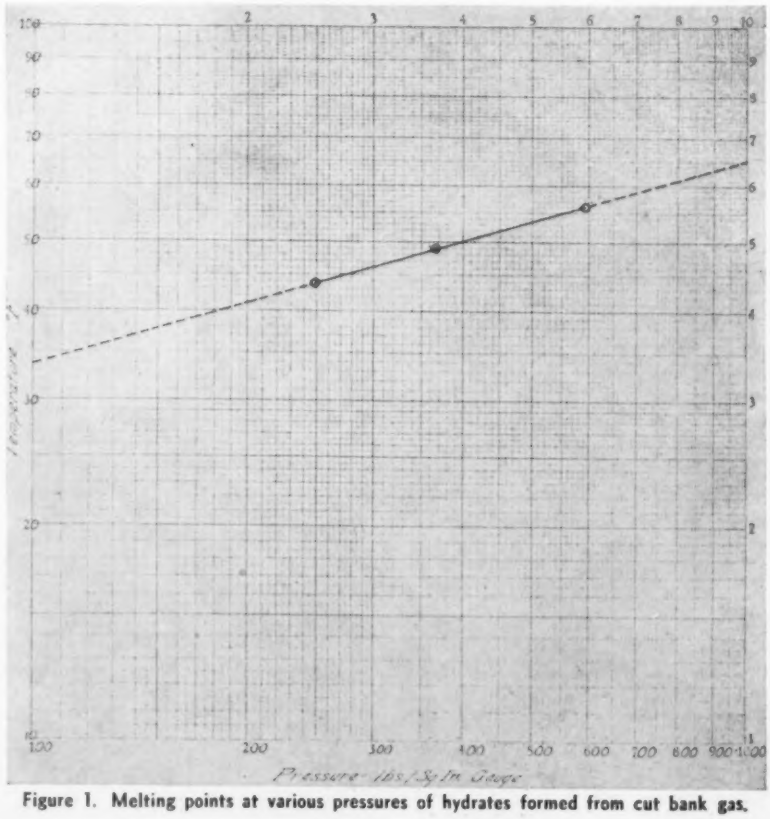


Figure 1. Melting points at various pressures of hydrates formed from cut bank gas.

Abstract of paper presented before Technical Section, A.G.A., Cleveland, Sept. 29th, 1937.

rather to provide constant gathering line operation during the winter. It is possible to operate field regulating stations without heating the gas prior to pressure reduction as long as the dehydrators function normally; however, there are times when weather conditions may delay the visiting of the dehydrators for periodic refilling. If dehydrator efficiency drops off, then it is probable hydrates will start to accumulate in the gathering line, but the interval before complete stoppage would occur is so much longer than the time involved for the freezing of a regulator that heating of the gas is justified at regulator inlet when constancy of operation is paramount.

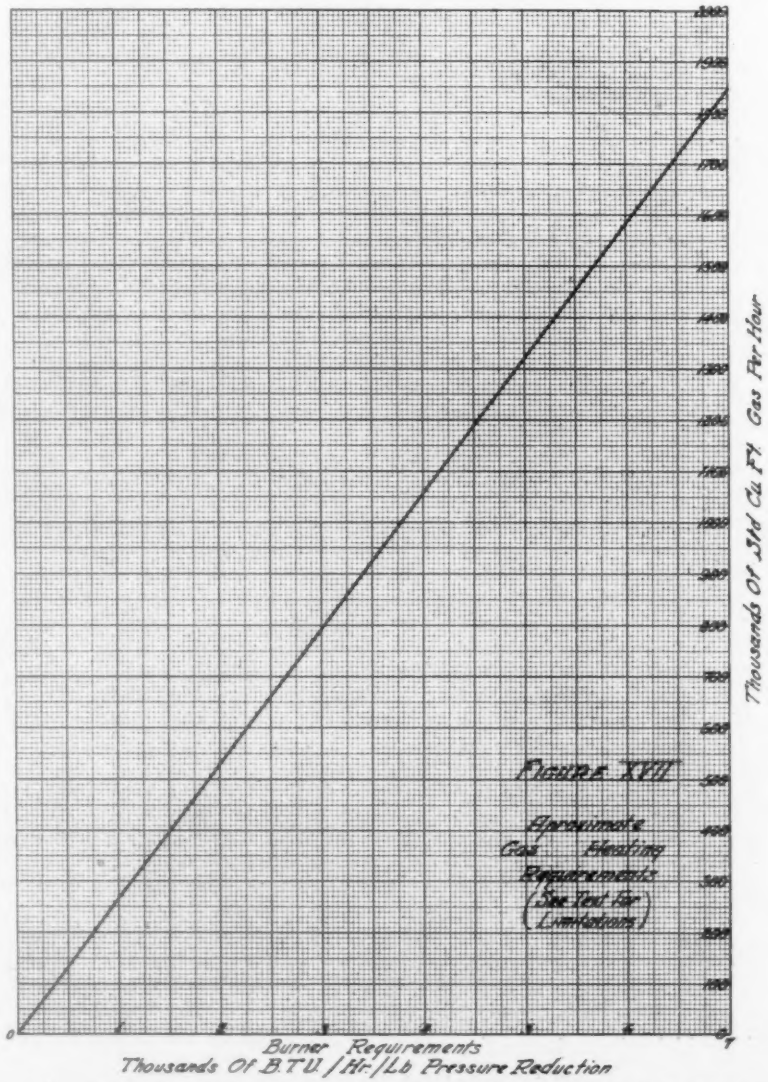
The worst fault of calcium chloride dehydration, and this is true of all absorption processes, is the fact that the ultimate dew points obtained are a function of the temperature of the brine. As such, the use of chloride would not be recommended in localities where low equilibrium temperatures are to be expected from high gas or atmospheric temperatures. An example of this is that the lowest dew point that can be expected from a 43° F. saturated solution, perfect equilibrium, is a 20° F.

The second major scheme for prevention of regulator freezing, and the one most commonly encountered, is the heating of gas prior to pressure reduction. The types and methods of heating are probably as varied as regulator installations. It is not infrequently the case, when freezing is only occasional, to apply heat directly to the pipe; the hazard involved in this case is extreme, and recommendations against such practice cannot be too strongly made.

A system which has been found by experience to be very satisfactory consists of a jacket around the inlet line of the regulator as explained above and a side arm water heater, using as many of the latter as are necessary to furnish the desired amount of heat. If the jacket is of such length that temperature differentials may set up strains between jacket and pipe, the jacket joint may be cut in half and a short sleeve coupling using asbestos gaskets installed. Counter flow with the hot liquid going in at the top and out at the bottom is normal course of fluid circulation. In such case an expansion tank is used on the hot line above the heater. A closed system is recommended with a temperature-pressure-vacuum safety valve installed in the cushion space of the expansion tank.

There are in use regulators with a steam jacket cast around the body. While no definite data are at hand as actual operating results, yet none too good results can be forecast for them in view of results obtained from a set-up wherein a stream of hot air was directed against the regulator body. Operating results obtained in this case were that the diaphragm case became so heated that the bare hand could not be held on it, yet at the same time the regulator froze. The shields as shown were then installed with a negligible increase in heating efficiency. It is conjectured that the heat is supplied too late to be of value; in other words, it is contended that one degree of heat in the entering gas stream is much more beneficial than ten degrees of heat available for induction to the exterior of the regulator body.

Earlier in the paper reference was made to the manner in which refrigeration could be influenced by turbulence. The actual effect of this factor in temperature reduction is impossible to ascertain, yet from experience it is known to be of significance. We had one particular installation wherein it was desired to try out a regulator whose main sales appeal was the fact that the amount of turbulence in the flowing stream was negligible and that the resistance to freezing was practically unlimited. A 1″ unit was installed in manifold with a 3″ conventional pilot operated regulator with 1½″, balanced, parabolic valves. Conditions were excellent for the formation of hydrates, and inasmuch as it was the constantly observed control point on a 120 mile line upon which there was only a 30% capacity factor, no particular hazard was involved if actual freezing should occur. The average of repeated tests indicated that the balanced valve would start freezing in 15 minutes and the valves would be stuck completely within 30 minutes. On the other hand, about 3½ hours were required before the streamlined


Thousands Of Std Cu Ft Gas Per Hour
FIGURE XVII
Approximate Gas Heating Requirements
(See Text for Limitations)
Burner Requirements
Thousands Of B.T.U. / Hr. / Lb Pressure Reduction

Approximate chart which indicates the number of B.t.u.'s required at the burner for a given quantity o f gas for each pound of pressure reduction through a regulator.

149
~~65~~

Utilities Know from Experience that "CARBOSEAL" Anti-leak Is the Low-Cost Means of Reducing Cast-Iron Joint Leakage

SINCE the renovation of dry distribution systems with "Carboseal"* anti-leak was begun over four years ago, 149 gas companies throughout the country have found by practical application that "Carboseal" anti-leak treatment is lasting, inexpensive and effective.

Joints in a section of a gas main treated with "Carboseal" anti-leak in March, 1933, are still tight, on the soap test. After four years of exposure to dry gas, "Carboseal" anti-leak liquid can be readily squeezed from the jute packing.

The cost of "Carboseal" anti-leak treatment is much lower than that of other permanent methods of correcting leakage. Treating connections are required only at the high points in the main, and there is no interruption of gas service while the liquid is being introduced. Widespread experience indicates that the cost of "Carboseal" anti-leak required per mile of 3-inch equivalent cast-iron main averages ninety dollars.

Meter tests by many gas companies on cast-iron mains, where no services were connected, showed 100 per cent reduction in leakage; and on mains with connected customers, showed leakage reductions from 50 to 95 per cent after "Carboseal" anti-leak treatment. In general, residual leakage was found to be in the services. Of particular interest is the report of one company which treated the entire cast-iron portion of a system in one town. The unaccounted-for gas loss dropped 76.2 per cent upon the completion of "Carboseal" anti-leak treatment. This company estimates that the cost of treatment will be paid for in slightly over one year.

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regulator would freeze, and then the peculiar feature of it was that hydrates would build up on the regulator inlet and either plug the inlet or attain such proportions as to impede valve movement. While it cannot be said with certainty, we have reason to believe that in all those cases where freezing of this type of regulator has occurred, never have we had positive information that it occurred in the outlet tube.

The question often occurs as to which regulator would freeze more rapidly, a large regulator reducing the pressure of the same small volume of gas as a small regulator. This is a frequently encountered circumstance, being the comparison of the resistance to freezing of an oversize and under-size regulator. The answer is that both will freeze, though it is probable that the large regulator will go out of service more rapidly. The cause of this is: That for a large regulator passing a small volume, the valves operate very nearly on their seats, and in view of this condition, it is not difficult for a hydrate bond to form between the valve and seat, thus restricting the flow. The one feature by which such a regulator can operate for a considerable period without freezing is the stored heat in the large amount of metal available to the gas stream, which being small, requires very little heat to prevent freezing. The small regulator will encounter difficulties because of the high velocity and turbulence involved in the passage of a quantity of gas in excess of its capacity.

Certain beneficial results have been encountered in the use of the soft seat valve. These results are, however, confined to an externally guided valve. The reason for their resistance to freezing is: The valve stem and the valves themselves serve as the main source of heat to the passing gas. In the case of the metallic seat, then the heat transfer from the valves to the seats, and hence body, is more rapid than in the case of the composition seat which material almost invariably has a thermal conductivity less than the metal of the valve cage. Thus, it follows that if the temperature is not extracted from the metal serving as a conduit leading the gas up to the valves, then the gas will not be precooled prior to expansion.

The product of six years' experience in the operation of regulators in Montana, though it must be admitted that during the greater portion of this time the possibility of hydrate formation in regulators was not particularly imminent, has commended the merit of the pilot operated regulator versus the normal spring or weight loaded type. The reason for this is not particularly difficult to be seen and can probably be best illustrated in this fashion: Should the discharge pressure be around 50 lbs., then in all probabilities in a weight or spring loaded type, a 7″ case would be installed. As such, the effective area of the diaphragm would be approximately 38 square inches. Thus, on a 1 lb. change in discharge pressure there would be available to the valve stem for the movement of the valve, approximately 38 lbs. A pilot system, properly installed, should have a one-half pound sensitivity at the above mentioned discharge pressure. This half pound sensitivity would mean that the pilot valve should go from completely closed to completely open on a half pound change in discharge pressure. In the normal pilot operated regulator a 15-lb. motor pressure is pretty much common practice which permits the use of an 11″ diaphragm which has an effective area of approximately 95 square inches. If the pilot valve allows only a 5 lb. variation—and it should be greater than this—then there are 475 lbs. available to the stem for movement of the regulator valve, less, of course, friction and the dead load of weights or springs, as the case may be. It has been noted time and again on our system that the record of the orifice meter downstream from the first stage regulators will become fuzzy when hydrates are forming in the regulators. At the same time the static variation will be barely perceptible. Likewise, straight spring-loaded diaphragm-actuated regulators under similar conditions will start giving wide sweeps of flow and pressure; the pressure variation being an index of the severity of freezing in that it indicates how strong a hydrate bond is being formed between the valve and the body.

Although the occurrence of freezing in regulators may be somewhat remote from normal practice in most areas, that in itself should seem to be sufficient reason for outlining a definite course of procedure to be followed when that unfortunate circumstance does occur. When the indications described earlier in the report seem to indicate without question that hydrates have accumulated in the regulator to such an extent as to seriously impair, if not totally preclude, its operation, then two courses can be followed, these being dependent upon the nature of the installation.

First, should the physical arrangement of material be such that the regulator can be by-passed, then cut the manifolded regulator into operation, or if it is merely a by-pass, crack the valve and go on manual control. It should be here noted that this manually operated valve will require much closer attention than under normal circumstances. Inasmuch as conditions are critical for the formation of hydrates, it will probably start shutting off due to an accumulation of the latter. If it is at all possible, someone should be delegated to devote his entire attention to the control of pressure through this valve and continually re-adjust the ports to break lose what hydrate may be forming. As for the regulator which has been removed from service, reduce the pressure on it to atmosphere, and the hydrates will in time disappear. If the attempt is made to blow the water resulting from the dissipation of the hydrates from the regulator, it is better to use gas from the downstream side, inasmuch as its dew point has been reduced by expansion, and it is entirely probable that, unless the fittings or turbulence creating devices are too compactly arranged, there has been a sufficient elapse of time to allow for transition of pressure energy into heat energy so that it will pick up the water vapor in the regulator. It is highly desirable that all the water be removed from the regulator if possible, since that much more time will be allowed before hydrates re-occur, and if there is no water present, then conditions will be such that water will have to be deposited from the gas, a nucleus isolated, and the phenomenon initiated If it is not feasible to vent the regulator body to atmosphere, then it is possible that one of the inhibiting agents mentioned previously be injected into the inlet side of the regulator and then blow back as suggested above.

For the second instance where it is not possible to remove the regulator from service, then the most generally accepted course of procedure is to wrap sacks or matting about the regulator body and pour warm water over it. Due care should be exercised at the time this operation is performed to obviate the possibility of existing hydrates cutting loose when the regulator valve is nearly open and allowing a shot of pressure to occur on the downstream side of the regulator with the attendant possibility of diaphragm rupture. The foregoing adjuration is pertinent to the injection of alcohol, glycerine, ammonia, or other inhibitors.

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Actively Serving the Gas Industry.

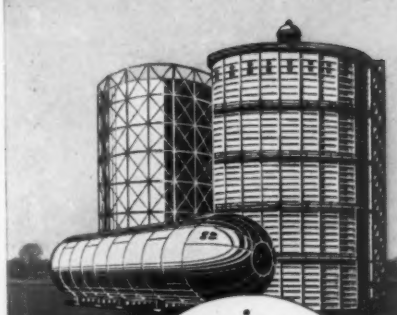
In the past twenty years, Stacey Brothers has built approximately 50% of all U. S. holders; in the past five years approximately 75%, and approximately 50% of the total capacity.

In the past year, 1936, Stacey Brothers built approximately 65% of the total holder tonnage according to U. S. Department of Commerce figures.

There is a tangible, dollars and cents value in dealing with an organization built around men of wide experience and training in their specialized field. Specifications, carefully detailed as it is possible to make them, do not cover the factors which cannot be reduced to engineering formulae. When decisions are to be made on the placing of contracts, consider well the importance of going beyond the specifications in making comparisons. Experience is what you are really buying — the experience of the organization to which you entrust your work — and the experience of those who have had work previously constructed by that organization.

Progress within this organization has gone steadily forward, evidenced by — The successful application of welding to large steel plate construction — Standardized inspection and maintenance service by trained men equipped with instruments permitting interior inspection of holders in service — both pioneered and introduced in the U. S. by Stacey Brothers — the Introscope and the Disc Cutter.

This experience is available to you either in new construction of the latest type or in helping to prolong the useful life of existing equipment. Write for any information you may need.



STACEY KLONNE AND TELESCOPIC GAS HOLDERS
STACEY BULLET PRESSURE HOLDERS
PURIFIERS AND STEEL PLATE CONSTRUCTION

Stacey BROTHERS
GAS CONSTRUCTION COMPANY, INC.
CINCINNATI, OHIO
DIVISION OF INTERNATIONAL-STACEY CORPORATION

Another new STATION — another call for COOPER — BESSEMERS!

"NORTHERN NATURAL"

Showing the two Type-19 compressor units, each rated 800 H. P., at the Ogden, Iowa, station.

To meet the increasing demand for natural gas in Minneapolis and St. Paul, the Northern Natural Gas Company once again has said, *"Give us more Cooper-Bessemers!"*

The newest main-line compressor station is located at Ventura, about 12 miles west of Mason City, Iowa. Three Type-19 twins (each rated 800 H. P.) will insure the same uninterrupted service that has made Cooper-Bessemers so satisfactory in the four other stations, shown.

THE COOPER-BESSEMER CORPORATION

Mt. Vernon, Ohio — PLANTS — Grove City, Pennsylvania

25 West 43rd Street, New York City | Mills Building, Washington, D. C. | 640 East 61st Street, Los Angeles, Calif. | 201 East 1st Street, Tulsa, Oklahoma | 631 Spring Street, Shreveport, La. | Magnolia Building, Dallas, Texas | Esperson Building, Houston, Texas

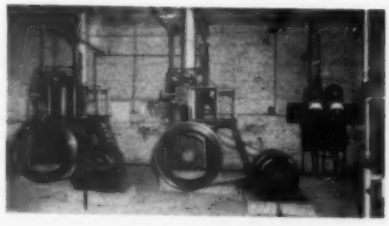
Report of Gas Engine Power Committee

E. J. Hatzenbuehler, Chairman

Lone Star Gas Company,
Dallas, Texas

THE report of the Gas Engine Power Committee for the 1936 Association year, which was the first report of that character ever prepared by the Industrial Gas Section, dealt largely with the total operating cost of natural gas engine power in cents per horsepower hour at the shaft. This year's report undertakes to furnish information, data, etc., that may prove helpful to those who have considered the possibilities of increasing gas revenues by encouraging the installation of natural gas engines, those who, for the first time, have been charged with the responsibility of increasing gas sales through the medium of gas engines, and those who have been actively promoting the sale of gas engines for a number of years. It consists essentially of the following subject matter:

1. Natural gas engines now available and the approximate range of sizes produced by the various manufacturers.
2. Typical gas engine installations.
3. Analysis of gas engine accounts as reported by fifteen gas companies operating principally in the States of California, Oklahoma, Arkansas, Louisiana, Texas, Georgia, Ohio and Pennsylvania.
4. Total engines reported in analysis of gas engine accounts, segregated according to types of industries served. This analysis does not include any engines used in oil field operation such as drilling, pumping, prepressuring or lease operation. Neither does it include any engines owned or operated by gas companies used for compression of natural gas in gas fields or along gas transmission lines.

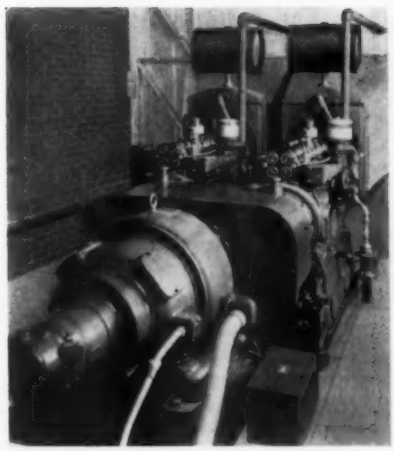


Burden-Smith & Co., Department Store, Macon, Ga. 1 - 2 cylinder - 55 h.p. Bruce-Macbeth Gas Engine 1 - 2 cylinder - 65 h.p. Bruce Macbeth Gas Engine. Each driving 1200 r.p.m. alternators through V-belts. Installed 1934.

Gas Engine Equipment Available

The following is a brief tabulation of data available at the time this report was prepared. It is expected that the ratings and speeds are not sufficiently close for selecting manufacturer's equipment; however, it is intended that this table may be helpful in contacting various manufacturers who can then supply complete information. The columns "Range of Sizes" and "Governed Speeds" are only approximate and have not considered piston speeds, bearing pressures and the like which each manufacturer will consider in furnishing equipment for such service as may be specified.

Name of Manufacturer	*Address*	*Range of Sizes Brake Horsepower*	*Governed Speeds R P M*
Allis Chalmers	Milwaukee, Wis.	28 to 92	to 1300
Bruce-Macbeth Engine Co.	Cleveland, Ohio	45 to 425	to 450
The Buda Co.	Harvey, Ill.	47 to 162	to 1800
Clark Bros. Co.	Olean, N. Y.	30 to 240	to 450
Climax Engineering Co.	Chicago, Ill.	29 to 153	to 1800
Continental Motors Corp.	Detroit, Mich. Muskegon, Mich.	10 to 80	to 1800
Cooper-Bessemer Corp.	Mt. Vernon, Ohio Grove City, Pa.	130 to 1200	to 400
Fairbanks-Morse & Co.	Chicago, Ill.	10 to 42	to 1500
Hercules Motors Corp.	Canton, Ohio	14 to 107	to 1800
International Harvester Co.	Chicago, Ill.	18 to 88	to 1800
Le Roi Company	Milwaukee, Wis.	45 to 290	to 1400
Lycoming Mfg. Co.	Williamsport, Pa.	25 to 60	to 1500
The National Supply Co.	Springfield, Ohio	25 to 900	200 and 720
National Transit Pump & Machine Co.	Oil City, Pa.	20 to 1500	125 and 720
Sterling Engine Co.	Buffalo, N. Y.	88 to 520	to 1200
Waukesha Motor Co.	Waukesha, Wis.	10 to 300	to 1500
Worthington Pump & Machinery Corp.	New York, N. Y.	15 to 1200	225 and 800



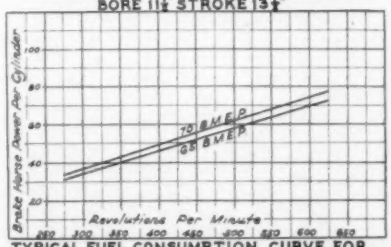
Liberty Cash Grocery, Memphis, Tenn. 50 k.w. - Lycoming Dual Generator Set - 120 - 208 volt - 60 cycle - single and 3 phase. Supplying electrical energy for lights and small motors. Installed 1937.

Fuel Consumption Curves

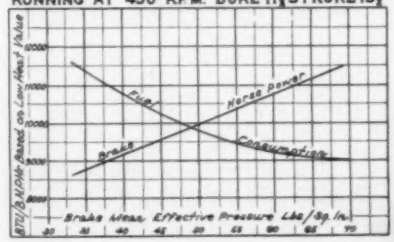
The following curves were developed for the purpose of serving as a general guide on fuel consumptions.

TYPE GNG 11½"X13½" GAS ENGINE VARIABLE SPEED RATING CURVES & FUEL CONSUMPTION AT 450 RPM

RATING CURVE FOR COOPER BESSEMER CORPORATION TYPE GNG GAS ENGINE BORE 11½" STROKE 13½"



TYPICAL FUEL CONSUMPTION CURVE FOR COOPER BESSEMER CORP. GNG GAS ENGINE RUNNING AT 450 R.P.M. BORE 11½" STROKE 13½"



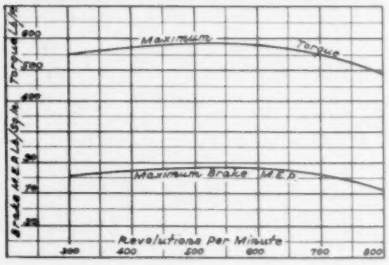
Presented before the Industrial Gas Section of American Gas Association, Cleveland, O., Sept. 27-Oct. 1, 1937.

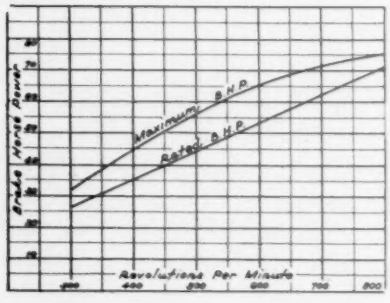
Typical Gas Engine Installations

The pictures of gas engine installations in industrial plants used herein were selected on the basis of:

1. Generally representative of gas engine power plant commonly found in a specific industry.
2. Geographic location of gas engine power plant.
3. Type of mechanical hookup employed.
4. Clarity and capability of being produced for this report.

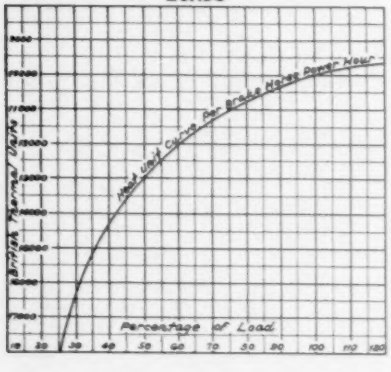
TEST CURVES OF FOUR CYLINDER 6"X9" TRANSIT VERTICAL GAS ENGINE



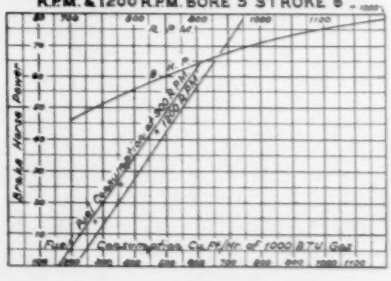


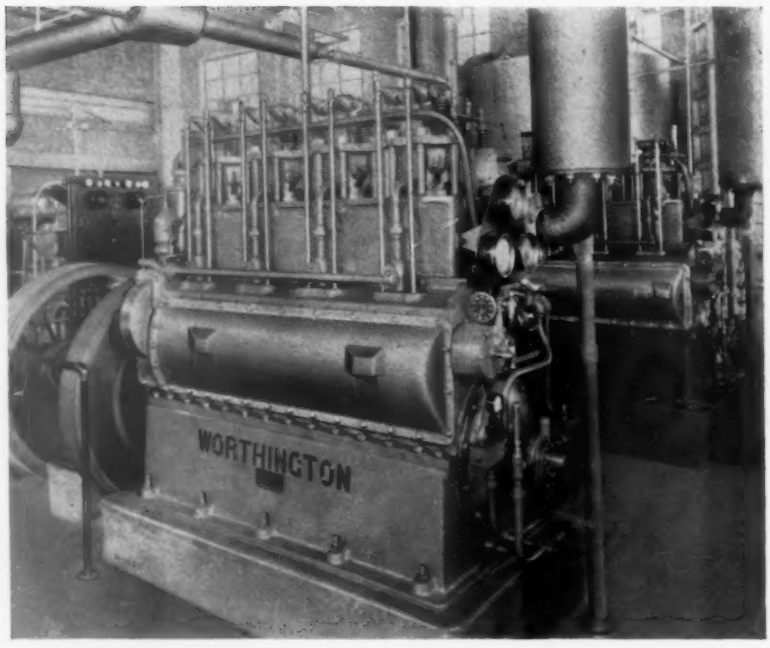
HEAT UNIT CURVE

SHOWING ACTUAL FUEL CONSUMPTION OF BRUCE-MACBETH GAS ENGINES AT VARIOUS LOADS

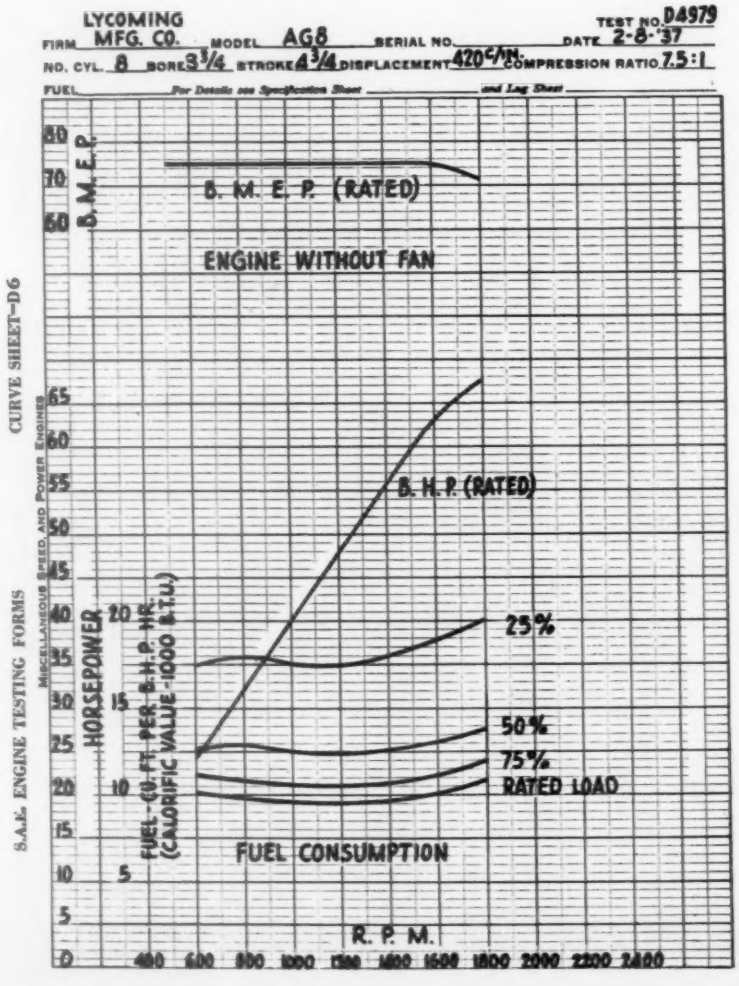


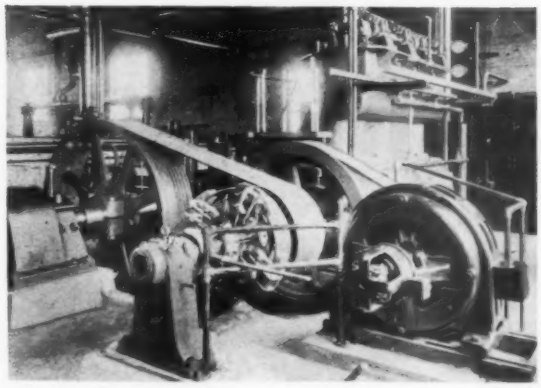
TYPICAL FUEL CONSUMPTION CURVES FOR 4 CYLINDER GAS ENGINE RUNNING AT 900 R.P.M. & 1200 R.P.M. BORE 5" STROKE 6"





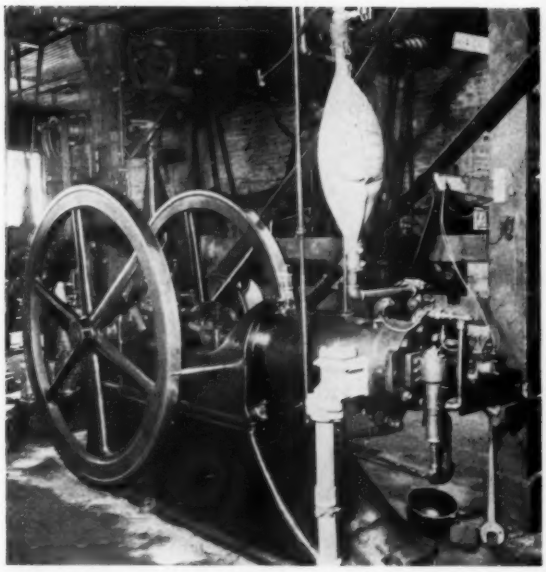
1 - BG-4 Worthington gas engine, direct connected to a 7½ x 7½ duplex ammonia compressor. In background 1 BG-3 gas engine, direct connected to a 6" x 6" duplex ammonia compressor. Each engine is also driving an electric generator, through Worthington Multi-V-Drive. In operation at Harlingen Ice Co., Harlingen, Texas.

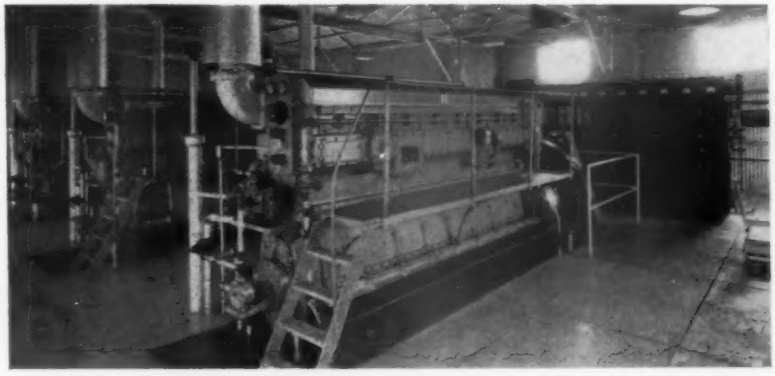




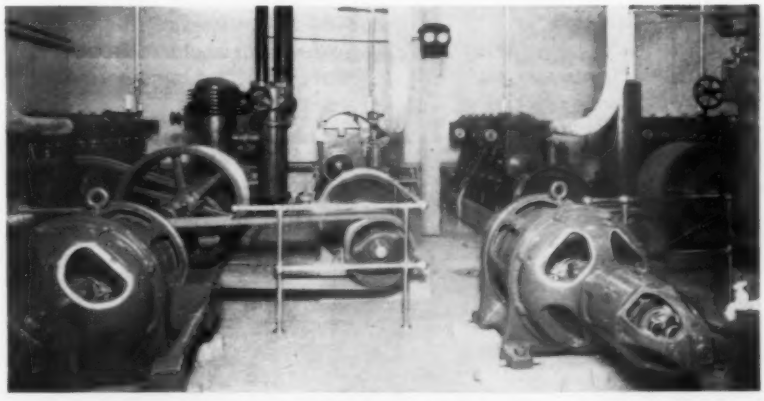
Above—Morris Ice Co., Jackson, Miss. One of 2 - 200 h.p. - 277 r.p.m. Bruce-Macbeth Engines, each driving horizontal ammonia compressor and 94 kva alternator. Installed 1934

Right; Cobb Machine Co., Cleveland, Ohio., 1 cylinder—12 h.p. at 200 r.p.m. Otto Gas Engine driving line shaft. Installed as used engine in 1906. It is estimated that this engine has been in service for 60 years. One two hour enforced shutdown due to failure of belt during 1936. Now operating approximately 175 hours per month.





E. H. Moore Electric Station, Fittstown, Okla. 3 - 8 cylinder - 400 h.p. at 400 r.p.m. each Cooper-Bessemer Gas Engines direct connected to alternators supplying electrical energy to surrounding territory. Installed 1936



Rialto Theatre, Dallas, Texas. 3 - 8 cylinder - 108 h.p. National Transit Gas Engines 1 - 6 cylinder - 80 h.p. National Transit Gas Engine. Belted to two Freon compressors and two 75 k.w. - 220 volt - 3 phase generators—air conditioning and lighting for two theatres. Generators can be pulled from either of three engines. Savings over purchased power reported to have paid for plant in 2 years' time. Installed 1935

It is not intended that any picture used herein shall be used as a yard stick to determine the particular make or type of engine that should be used in any one industry. The pictures submitted were not large enough in number to represent all makes or types of engines used in industrial plants; neither could each geographical locality be represented by a picture of a gas engine power plant for the same reason.

Your attention is called to the date of installation of some of the engines shown herein. The length of time these engines have been operating satisfactorily certainly establishes the fact that heavy duty gas engines are a reliable and economical source of power. Gas engine power plants that have operated satisfactorily for a period of from fifteen to twenty-five years are not unusual.

It is also interesting to note how the installation of one or more gas engines in an industrial plant leads to the installation of others in the same plant when additional power is required. It also appears that the installation of an engine in an industrial plant of a company leads to the installation of other engines in plants owned by the same company in other localities.

Analysis of Gas Engine Accounts

The following is a summary of the returns from the questionnaire covering Analysis of Gas Engine Accounts by Industries. Table No. 1 shows the summary by individual companies, listed in the order of magnitude of quantities of gas sold. The last five columns of this table show averages which are interesting principally

TABLE NO. 1
ANALYSIS OF GAS ENGINE ACCOUNTS

Company	Annual Sales M Cu.ft.	Annual Gas Revenue	Number of Accounts	Number of Engines	Total Engine H.P.	Average H.P. Per Engine	Annual Revenue Per H.P.	Annual Revenue Per Acc't	Annual Gas Sales Per H.P.— Cu.ft.	Annual Gas Sales Per Account— M Cu.ft.
1	661,992	$215,677.00	375	549	34,409	62.6	$6.26	$ 574.95	19,200	1,765
2	450,939	97,237.00	221	312	20,460	65.5	4.75	439.08	22,030	2,040
3	391,658	62,099.00	72	138	11,521	83.4	5.39	862.40	33,996	5,438
4	292,179	89,571.00	272	362	29,923	82.6	3.00	329.30	9,792	1,074
5	266,207	65,607.00	113	173	12,080	69.8	5.43	591.05	22,037	2,398
6	243,000	65,000.00	133	162	16,354	100.9	3.97	488.72	14,858	1,827
7	202,290	50,977.00	45	77	7,958	103.3	6.40	1,132.82	37,985	4,495
8	144,274	40,432.00	41	65	6,170	94.9	6.55	986.14	23,383	3,518
9	79,150	20,972.00	20	37	2,215	59.8	9.46	1,048.60	35,733	3,957
10	42,158	13,933.00	26	41	2,746	66.9	5.07	535.88	15,352	1,621
11	15,000	8,500.00	8	10	805	73.1	10.53	1,062.50	18,633	1,875
12	11,600	2,200.00	125	149	14,911	100.0	1.47	176.00	7,779	928
13	7,740	2,900.00	4	5	530	106.0	5.47	725.00	14,603	1,935
14	1,200	840.00	3	5	120	24.0	7.00	280.00	10,000	400
	2,809,387	$735,945.00	1,458	2,085	160,202	76.8	$ 4.59	$ 504.76	17,536	1,927
15			99	126	8,692	68.9				
	2,809,387	$735,945.00	1,557	2,211	168,894	76.3				

from the standpoint of establishing the upper and lower prevailing limits among those companies reporting.

Table No. 2 is a breakdown of the total number of accounts, total number of engines and total horsepower shown in Table No. 1, segregated according to industries. The totals for any one industry are the totals of the fifteen gas companies reporting. Included in miscellaneous unclassified small plants are metal plating plants, spray painting, box factories, fiber mills, electric welding, packing plants, greenhouses, etc.

Listing of accounts by industries should serve two useful purposes: (a) to give an indication of the gas engine fields already exploited and (b) to give an indication of other potential gas engine fields by listing as many different industrial applications as practical.

The industries reported do not purport to cover the complete field to which gas engines are applicable. It is worthwhile to note that the majority of returns were received from gas companies in the far West and Southwest, and, therefore, the type of industries reflects the geographic applications. It is hoped that a more general and diversified response can be obtained for future reports so that data will be more generally representative.

TABLE NO. 2

Type of Industry Served	Number of Accounts	Number of Engines	Total Horsepower
1. Water pumping, irrigation	418	579	35,386
2. Ice plants	201	381	34,595
3. Cotton gins	216	287	29,389
4. Feed grinding and flour mills	127	163	11,481
5. Utility electric generating plants, privately and publicly owned	16	33	9,255
6. Cotton oil mills	26	38	8,650
7. Machine shops and foundries	61	83	4,782
8. Creameries, dairies, milk product plants	55	77	3,828
9. Office bldgs., dept. stores, warehouses	17	33	3,554
10. Quarries, coal mines	23	33	2,610
11. Garages and filling stations	62	74	2,425
12. Glass mfg. plants	3	8	2,110
13. Laundries, cleaning, and dye works	40	51	2,035
14. Theatres	23	31	1,760
15. Produce and cold storage plants	27	40	1,703
16. Paper manufacturing	5	10	1,695
17. Planing mills, wood working plants	23	32	1,561
18. Oil refineries	10	15	1,420
19. Grocery stores and meat markets	59	64	1,385
20. Tile, brick and pottery plants	11	16	1,055
21. Sewerage disposal plants	2	3	880
22. Storage battery mfg. and repair	27	31	785
23. Bakeries, macaroni & meat packing plants	8	11	599
24. Hotels, apartments	4	6	521
25. Textile mills and garment mfg. plants	4	6	520
26. Drug stores and cafes	15	16	514
27. Gypsum, lime plants	2	4	480
28. Monument and marble works	17	18	525
29. Schools, colleges, universities	4	4	473
30. Auto tire retreading plants, rubber plants	2	7	365
31. Air reduction plants	2	2	360
32. Misc. unclassified small plants	47	55	2,193
	1,557	2,211	168,894

Following are total engine figures segregated by industries as reported by fifteen gas companies.

Conclusion

It is evident that the natural gas industry at large is not awake to load building possibilities offered by gas engine power. It appears as though very few gas companies have really made an intensive effort to attach this type load to their lines. The committee believes it is of sufficient importance that each gas company thoroughly analyze the potential load offered through the medium of gas engine power. This analysis can be made only by trained men, and trained men can be considered as such only after experience in this particular field. Experience in this field will furnish accurate operating cost. Accurate operating cost must be available if industrial engineers, new and inexperienced in this particular field, are to successfully promote the sale of gas engine power. At the present time, there is no medium or clearing house for the dissemination of this valuable information to the industry. It is recommended, therefore, that the American Gas Association arrange for the receipt of operating costs of gas engine power plants to be submitted by gas company industrial engineers in the form of data sheets, or the equivalent, and the Association distribute these data to interested companies. It is also recommended that the Gas Engine Power Committee each year prepare a report devoted principally to detailed and unusual phases of gas engine installation and operation and new developments in equipment and application.

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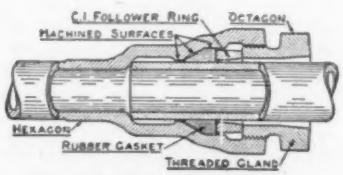

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Heating Liquids By Submerged Combustion

Presentation at open forum on Industrial Gas & Equipment

By C. H. Lekberg

Northern Indiana Public Service Co.
Hammond, Ind.

IN order to justify the inclusion of a paper on submerged combustion under the topic "Heating Liquids with Immersion Gas Heaters" let me explain that although the apparatus I am about to describe is truly a submerged combustion unit it can also be classed as an Immersion unit. The only difference in the two is that in the case of the former the products of combustion are vented into the liquid instead of being entirely separated from it as is the case with immersion units. How this is accomplished and the advantages will be discussed later.

Submerged combustion is not new having been accomplished in 1888 by Brunler in Germany. We have probably all seen a gas flame burning under water and thought more or less seriously about applying the principle to practical use. This has been tried with varying degrees of success.

Within recent years what appears to be a satisfactory submerged combustion system has been developed within the territory served by the Northern Indiana Public Service Company. This burner is now ready for the market. Seven years have been spent in the development of this burner and it has proved to be entirely practical.

The system consists of a control assembly so designed that the operator has only to press a starting button to put everything into operation. When shut down the solution in the tank will have completely filled the burner manifold and combustion chamber. As the starting button is pressed, a specially designed gas and air compressor is started up, and as the compressed air is purging the burner of solution, the control system begins to operate. Automatically a hot wire igniter is heated to incandescence and a flow of pilot gas is admitted into the burner. After a predetermined time to establish a uniform gas air flow, the main gas flow is permitted to pass through the system. The burner might be classed as a nozzle mixing type. It is so designed that there is no possibility of back firing. The burner plate is located about four or five inches below the solution level for cooling and directs the flame through a tubular combustion chamber which conducts the products of combustion down to and across the tub bottom where the products of combustion may be vented and distributed to give the rate and control of agitation desired.

Following the ignition of the main gas flame the burner controls lock themselves into a running position and will remain in that position until the desired solution temperature is reached. Thermostatic control actuates the control mechanism in such a manner that the flow of air through the solution is constant, and a flow of gas is turned on and off as heat requirements demand. This maintains a constant rate of agitation regardless of the solution temperature or rate of heat input. The burner system is entirely automatic in its operation and can control the solution temperature as close as one half of one degree.

The combustion efficiency of the burner is very high and may be set to give any flue gas analysis desired. To run an orsat analysis it is necessary to place an inverted funnel beneath the liquid surface. The products of combustion rising through the solution will be trapped in the funnel and forced through the tube of the orsat by pressure which depends upon the depth at which the funnel is held. The general practice is to set the burner for about a 5% air excess.

Submerged combustion should particularly interest the industrial gas man as it opens up new fields for the use of gas, is dependent upon gas for its operation and can not readily be converted to the use of a competitive fuel.

Submerged combustion can be used to advantage in many applications of solution heating. It is particularly adaptable to rapid distillation and concentration of solutions. It may be used to heat and agitate many types of cleaning solutions.

One of the most practical applications for submerged combustion, and the use which our company has most encouraged, is the pickling of steel. Although this is about the most difficult application that can be imagined for a combustion system, the advantages offered by submerged combustion are so great that this task was concentrated upon.

In the removal of scale from steel, the rate of scale removal will be in almost direct proportion to the rate of agitation, which may be accomplished either by moving the work within the solution, or moving the solution about the work. By the use of submerged combustion, the pickling solution, generally sulphuric acid, is agitated and moved about the tank at a rate that would probably be impossible to achieve mechanically. The terrific agitation developed by a submerged combustion burner serves also to keep the temperature of practically any size tank so uniform that the temperature difference in any part of the tank can not be measured.

One of the advantages of submerged combustion for pickling is its flexibility. Each pickle tank in a plant can operate as an independent and efficient unit. It is not dependent upon a central heat generating system whose efficiency falls off at anything under a full load rating.

The production rate of a pickle tub can generally be increased 100% by submerged combustion. The average time on various grades of steel will run from thirty to sixty percent of former practice if the operating temperature of the tub is the same with submerged combustion as it was with steam. If it is desirable to operate the pickle tub at a lower temperature, the same rate of production can be produced with a 140° temperature using submerged combustion that produced with 180° on steam.

Delivered before Industrial Gas Session, Nineteenth Annual Convention, American Gas Association, Cleveland, Ohio, September 27-October 1, 1937.

In many cases, however, it is desirable to operate at a higher temperature and increase the rate of production to the highest possible point. The main time limiting factor so far has been the material handling equipment for moving steel in and out of the tanks. This condition was found in the case of a steel plant in our territory. Experiments show that three and a half times the old rate of steel could be pickled in a tub with submerged combustion. However, their material handling equipment could not move the steel through continuously at this rate. For the fiscal year ending April 31, 1937 this plant showed a production increase of 104% per man hour over steam. The plant operates on a bonus basis and each man employed on submerged combustion production pickling earned a bonus of better than $1.00 per day due to the system. Needless to say they are all in favor of submerged combustion.

The reduced labor and overhead costs, combined with the lower investment in tanks and the lesser amount of floor space required, and an increased department production, have been found to effect such a saving that the installation could be sold on this basis alone. I believe that most plants base their overhead costs on labor. At least this is true of most of the industries contacted by our company. A saving of $1.00 in labor then becomes two or three dollars due to the basis of carrying the plant overhead.

The increased rate of production is due not only to the terrific agitation produced by the system, but also to the fact that the solution is not being diluted. With the use of steam every therm put into the tub means the addition of approximately one hundred pounds of water. In practice with submerged combustion, only enough acid is added to replace that used in the chemical reaction of the acid and steel, and it is only necessary to add water to maintain the desired solution level. This effects a saving in acid use of from twenty-five to fifty percent. The acid cost in steel pickling is a considerable item, so naturally becomes a good sales point in favor of the use of gas.

As steel is pickled in a quiet solutin hydrogen bubbles form on the surface of the metal. These bubbles create a gas film and practically stop further action of the acid on the steel until the bubble is broken. This causes hydrogeneration or acid embrittlement of steel and in many cases produces a mottled effect on the finished stock which may be a considerable disadvantage. The high rate of agitation produced in the solution by submerged combustion breaks down the formation of hydrogen bubbles before they are of measurable size. This constantly exposes the entire steel surface to action of the acid, producing a more uniform surface and eliminating all spotty work.

In the past year one steel plant in our territory saved 72c per ton on all steel pickled by submerged combustion. This saving was so great that the cost of the burner equipment was written off in less than six months. They have installed, at present, four submerged combustion burners replacing 70 Boiler Horse of steam.

Equipment has been ordered to replace an additional 150 Boiler Horse Power, placing all pickling and solution heating on gas.

Each tank becomes an independent unit when heated by submerged combustion. This also means that besides the advantage of flexible operation, the installation of one tank at a time can easily be made with no penalty. Combined with a very short pay-out, this should make it an attractive proposition to any plant, particularly when compared to the cost of a boiler and boiler house installation which must be installed with a great enough capacity to take care of future demands and still not so far over capacity that its efficiency at low rating will be too low.

In conclusion let me say that much time and money has been spent in perfecting this equipment. It has been in service long enough to prove its practicability and saleability, and is now ready for the market.

Sell Modernization to the Retail Baker

CLINTON B. COLE
Rochester Gas & Electric Corp.
Rochester, N. Y.

As the baker visualizes his model bakery, solid fuel or oil-fired ovens do not fit into the picture. He does not want to open his shop to the public and display either a solid fuel or an oil-fired oven. A new gas oven will give the baker flexibility of control that cannot be equalled by any oven using another fuel. It will enable him to bake a greater variety of goods in a shorter time than possible with other ovens. Retail bakers using the newly developed gas ovens are well pleased with the operating costs. With these new ovens a high class retail baker doing a $400.00 business per week will have a gas cost for baking of approximately $5.00, or the gas costs for baking will be about one and one-quarter per cent of the amount of sales. This is based on 540 Btu gas at 75c per M. The fact that such results can be obtained shows achievement in oven design of which the gas industry may well be proud. This development has attracted attention. It points the way for further developments that will help to secure a class of business that is needed by the gas companies of the country and that rightfully belongs to them.

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A Study Comparing the Effect of Gas and Oil Ranges on Overall Costs in Commercial Kitchens

By A. O. Leech
Portland Gas & Coke C.
Portland, Oregon

This is a study to bring out the difference in overall costs by the use of gas and oil as cooking fuels.

GAS RANGE

OIL RANGE

Investment

Cooking Equipment

A modern three-unit gas range with flexible cooking top zones and three independently fired ovens each equipped with automatic temperature controls and insulated walls may be secured for the sum of $770.00. Broiler and deep fat fryer cost $550.00 making a total cooking equipment cost of $1320.00.

A heavy duty oil-fired range, oil burner, and oil storage tank will cost $1,000.00. Broiler and deep fat fryer cost $550.00 making a total cooking equipment cost of $1550.00.

Ventilating Equipment

The insulated oven walls of a modern gas range permit but little heat to escape into the kitchen. The zone control of the cooking top allows that part not covered with utensils to be shut off, thus further reducing the amount of heat to be removed by the ventilating system.

An oil-fired range is heated by a single flame and the entire range must be kept hot at all times. The intense temperature of an oil flame produces considerable radiation of heat. Exact data on the cost of the extra ventilating capacity required to remove this heat is not available but it is reasonable to assume $200.00 as a nominal figure.

Air Conditioning Equipment

Air conditioning equipment has been installed by some of the foremost restaurants and there is every indication that competitive conditions will make it imperative for every high class restaurant to install such equipment within a short time.

To prevent kitchen odors from reaching the dining room, the dining room should ventilate into the kitchen. The extra ventilation of the kitchen required by an oil range means greater air change in the dining room and hence greater capacity of the air conditioner. An extra investment of $200.00 is a reasonable assumption.

Fixed Costs

Gas ranges are simple in construction and do not have any parts subject to severe radiant heat or rapid motion. If given care they will last for years with but little expense for repairs. To charge them with depreciation and obsolescence on a ten year basis is very conservative.

Oil ranges are subjected to the severe radiant heat of an oil flame and the burner has parts subject to pressure, rapid mechanical motion, and rapid flow of liquid. Repairs when necessary are expensive. To base their depreciation and obsolescence on a ten year basis is very liberal.

Operation

Labor

Cooks who have worked on a modern gas range are loud in their praise of them because of the absence of heat on their legs and of less radiant heat from the tops. The automatic oven temperature control and flexible top control gives much relief from pot and oven watching.

Good labor naturally gravitates from places offering poor working conditions to places offering good conditions. Persons subject to wide temperature variations are more apt to be absent on account of sickness, and are less efficient when working. The cost of turn-over, lower efficiency, and absence can reasonably be estimated at $250.00 per year.

Power

The operation of gas ranges does not require the operation of any electrical motors.

The motor that drives the pump of an oil burner must be operated continuously during the use of the range. This motor and the extra capacity of the ventilating and air conditioning motors adds materially to the demand upon which the power rate is based. The range should be charged with an electric energy cost of $120.00 per year.

Auxiliary Fuel

The proper preparation of some foods requires special appliances. The two most essential are a broiler and a deep fat fryer with temperature control. A special fryer will produce better food and use less grease than a kettle set on a range top. There are other auxiliary appliances which consume the upper blocks of the gas rate.

The quality of food served at homes has reached a very high level due to the attendance of housewives at the numerous cooking schools. People expect the same quality in a restaurant. It is impossible to do broiling, toasting or proper deep fat frying on an oil range and hence auxiliary gas appliances are necessary.

Abstract of paper delivered before Industrial Gas Session, American Gas Association, Cleveland, September 27-October 1, 1937.

Range Fuel

Elsewhere is an estimate of the fuel consumption of suitable gas ranges. In making this estimate the effect on each part of the equipment of the different operating periods has been considered. The 82,000 cubic feet consumed per month by the ranges will cost $774.60 per year.

The quantity of heat in a gallon of diesel oil is equal to that in 250 cu. ft. of gas. However, due to the fact that all of an oil range must be kept hot while part of a gas range not needed can be shut off, it is not necessary to use equal amounts of heat. Where oil ranges and modern gas ranges have been used under identical conditions it has been found that 140 cu. ft. of gas is equivalent to a gallon of oil. Hence 82,000 cu. ft. of gas is equivalent to 585 gallons of oil per month, which at 6c per gallon will cost $350.00 per year.

Food Costs

Meat Shrinkage

Tests conducted by the National Livestock and Meat Board of Chicago have fully demonstrated the effect of temperature control on the shrinkage, flavor, and texture of meats. Modern gas range ovens have automatic temperature controls so that proper results may be obtained and repeated.

Definite oven temperatures cannot be readily obtained and maintained with an oil range because both top and ovens are hated by a single flame. Excessive shrinkage due to this condition can conservatively be estimated at 5%. On the basis of four thousand pounds of meat per month at 18c per pound this amounts to $432.00 per year.

Food Spoilage

Many foods other than meat also require accurate temperature control. Gas range ovens can be set at any temperature between 250 deg. F. and 500 deg. F.

Such foods as puddings, fish, and fruits are easily scorched if prepared in an oven too hot. Such items as potatoes and macaroni become soggy if not sufficiently heated. Such spoilage is conservatively estimated at $120.00 per year.

Summary of Costs	*Gas*	*Oil*
Investment Chargeable	$1320.00	$1950.00
Annual Costs		
Interest—6%	$ 79.20	$ 117.00
Depreciation—10%	132.00	195.00
Taxes and Insurance—1%	13.20	19.50
Labor Difference	—	250.00
Power	—	120.00
Auxiliary Fuel	278.40	278.40
Range Fuel	774.60	350.00
Meat Shrinkage	—	432.00
Food Spoilage	—	120.00
Total	$1277.40	$1881.90

Editor's Note: This study brings out clearly the fact that full costs alone are misleading in estimating the relative economy of commercial cooking by gas and oil. Not only is the first cost of gas burning equipment less but the difference in labor and in cooking results is so great that fuel cost alone is completely overshadowed. Fuel cost is only one part of the story.

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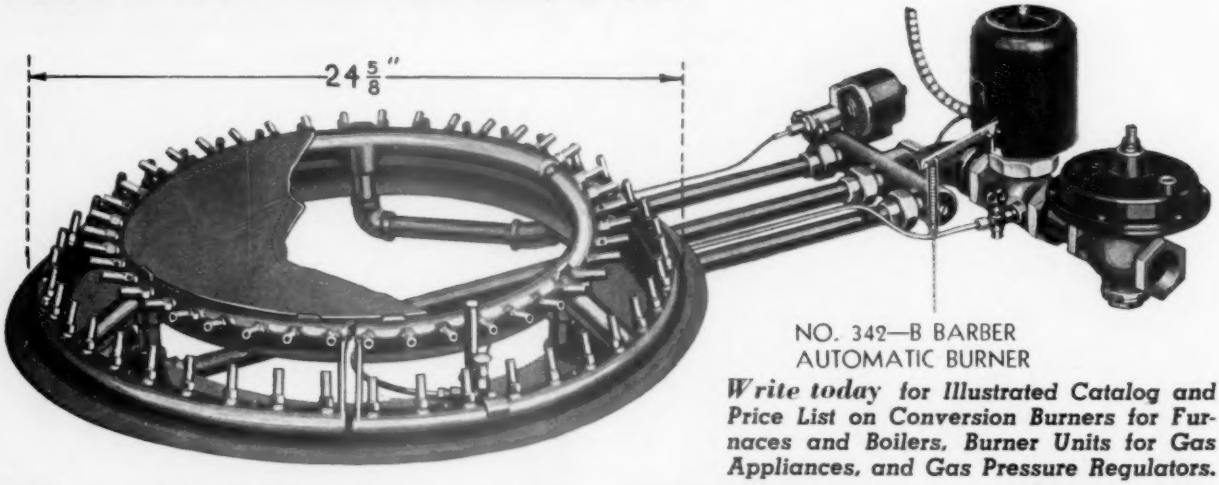

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Averaged Bills—Their Advantages and Disadvantages

E. F. Embree

New Haven Gas Light Co.,
New Haven, Conn.

Chairman,
Subcommittee of the Customer Accounting Committee

THE practice of averaging bills has been adopted by so many companies, that the Customer Accounting Committee felt it to be an appropriate subject for presentation to the Accounting Section.

Although this is the first formal report on the procedure of averaged bills, the subject is by no means a new one to the Accounting Section.

An article written in the April, 1927, *American Gas Association Monthly* on the subject "Portland Uses Meter Reading Tapes," in discussing missed readings, touches upon this point:

"Where a second call was made through a bill deliverer and no reading was secured, estimated bills were rendered for two months."

The subject also was discussed at the 1931 A.G.A. Annual Meeting. At that time a representative of one of the companies, whose customers' accounting procedure was the subject of discussion, reported as follows:

"No attempt is made to pick up skip readings until three months have elapsed. The first, second and third months' readings are skipped and a bill for the same consumption as the previous month is rendered, provided it is comparable to average consumption. A proper explanation is given to the effect that the meter reader was unable to obtain reading and consequently a bill is being rendered on the basis of previous bills. However, at the expiration of the third month, and after the rendition of the third estimated bill, a determined effort is made to obtain a proper reading."

Five customer accounting plans were presented at the meeting referred to above. The presentation of five systems, using five different types of equipment, provoked considerable discussion, much of which centered upon the reaction of the participants to the practice of averaging bills. The reaction at that time was decidedly negative.

However, just as first impressions are not always lasting, neither are negative reactions permanent.

Paper presented before the Accounting Section of American Gas Association, Cleveland, O., Sept. 27 to Oct. 1, 1937.

Missed Readings

That missed readings are an expensive but necessary evil is taken for granted. The usual methods employed to obtain missed readings are:

A call back the same day or the following morning by the regular meter reader.

A call the next day by a special meter reader.

A call on Saturdays or on a non-reading day.

An attempt to secure a reading at time of bill delivery, when bills are hand delivered.

Night calls on special cases.

The use of business reply post cards, with meter dials printed thereon.

The use of business reply post cards appears to be more in favor than other methods, due to the saving of time and labor as against the cost of the cards and postage when the cards are returned.

Some companies do not make any attempt to secure missed readings for a period of two months, where the average consumption is too small to warrant the expense.

In some cases where meter readers are penalized for missed readings, there has been to a small degree a tendency toward averaged or curb readings. In the past, precautions against such readings have been taken by the use of meter reading tapes or perforated route sheets, but these methods have been replaced by more simple and efficient safeguards.

There are many other problems incidental to missed readings, which are to a great extent solved by the averaging of bills, and their solutions will be found under the detailed advantages of averaged bills.

Averaged Bill Plan

The practice of rendering averaged bills has reached a point of acceptance where it is possible to present a practical composite plan, based upon the general procedures followed by companies who have adopted the practice. Where these general procedures differ in certain important details, the differences are so noted.

Meter Readers Procedure

Meter readers should make every effort to secure meter readings on the scheduled reading date. Where it is not possible to read the meter, information should be provided as to why it was not read.

Such information should be noted on the route sheet, either on the reverse side in detail or in the reading space by symbols. These symbols would include "N.H." (Not Home), "O.V." (On Vacation), "O.C." (Out of City), "C" (Closed), "V" (Vacant) and any others desired.

Care should be exercised in securing and noting such information, as it will not only determine whether an average bill should be rendered but will serve as a guide in estimating the reading.

If, when a meter is regularly read following an estimated reading, it is found that the previous month's estimated reading was incorrect, the current reading should be recorded in the regular manner by the meter reader and the estimated reading should be marked in such cases "OE" to indicate that it was over-estimated. In such cases the consumption is determined by substracting the actual reading prior to the estimated reading from the present reading.

As noted subsequently under "Billing Procedure," certain accounts are excluded from the average bill plan. Missed readings on these accounts should be handled according to the practice in effect at the time the average bill plan is installed.

As a check on so called "curb readings," the same penalties should apply to missed readings when it is proven that the meter could have been read on the regular call.

Billing Procedure

Although one large combination company provides that the estimated reading be made by the meter reader while at the customer's premises,

subject to a later check by the Billing Department, it appears to be general practice to have someone in the Billing Department estimate the reading.

It is the policy to exclude certain customers from the averaged bill plan. These exceptions are:

Customers averaging 20,000 cubic feet or more per month. House Heating Customers. If it is desired estimated readings may be made during the non-heating season (June to September inclusive).

Customers whose meter readings have been estimated or submitted by the customer for two consecutive months prior to the current reading date.

Premises which have been closed or are apparently vacant.

Seasonal Customers

New customers who have been using service for a period of less than three months.

Customers who have specified that they do not wish a bill based on estimated readings. (Meter route sheets for such accounts should be stamped "Do Not Estimate.")

At the introduction of the plan, any customer whose meter was not actually read for the preceding two months.

Customers whose usage varies between periods.

After reviewing the information provided by the meter reader as to the cause of non-reading, and giving due consideration to accounts as outlined under exceptions, on which no average bill is to be rendered, the billing department clerk should estimate the meter reading for the current billing month based on the following factors:

Consumption shown for each of the preceding three months.

The trend of the monthly consumption.

Gas used in the corresponding month of the previous year (where such information appears on the route sheet).

Special conditions such as vacations, visits, etc., as noted by the meter reader.

The estimated reading and consumption should be recorded on the meter route sheet in the lower portion of the current month space in the same manner as if the reading had been obtained. In addition the code "E.R." indicating "Estimated Reading" should be recorded in the data column. The code "E.R." estimated reading and consumption may be entered in green ink if it is desired that it stand out.

Billing procedure for estimated readings should be the same as for actual readings except that all averaged bills should be stamped *"This Is an Averaged Bill."*

NOTICE

Our meter reader called but was unable to obtain a reading of your meter. The bill attached is, therefore, estimated based on your normal use of service, and is rendered to avoid a billing period of more than one month. Any question concerning this charge will be answered gladly, on request.

NOTICE

Our meter reader called, but was unable to obtain the regular reading of your meter. Therefore the bill attached is estimated and based on your previous use of gas.

This arrangement is for your convenience in order to avoid a billing period of more than one month.

If the amount is more or less than you have actually used, the difference will be corrected in the next regular reading of the meter.

THIS IS AN AVERAGED BILL

Our representative was unable to obtain your meter readings on the regular date. In order to avoid too long a billing period, your meter readings have been estimated. This estimate is based on your use of service in previous months.

If you desire to have a bill based on actual readings, please show the positions of the hands on the meter dials on the back of the attached bill and return it to the Company. If your reading warrants it, a corrected bill will be mailed to you.

Directions for Recording Meter Readings: Mark positions of hands on meter dials on the back of your bill, drawing lines from outside of circle to center. If your meter has only three dials, use the three right-hand dials on the form. Please show the date of your reading.

NOTICE

We were unable to obtain your meter reading on the regular reading date. For your convenience, so that you will receive a bill monthly and avoid too long a billing period, the attached averaged bill is rendered on the basis of your average monthly use.

The bill which will follow the next reading of our meter will automatically adjust any variation that may exist in this present averaged bill.

Exhibit 1

Accounting Procedure

Dependent on local accounting procedure, before the bills reach the mailing or delivery room a notice should be attached to the statement side of each averaged bill. Sample notices (Exhibit 1) are self explanatory and a matter of preference with the individual company as to color, size and wording.

When it develops that a previous month's use has been over-estimated, the incorrect averaged bill for the previous month should be cancelled by a journal entry. If the averaged bill has not been paid, a corrected bill should be rendered to the customer for the two months' period, with a letter of explanation indicating it to be a corrected bill based on actual meter readings. If the averaged bill has been paid, the over-payment should be credited or refunded following present practice for handling over-payments or credits and the customer so informed by letter.

The same practice should be followed when a final reading disclosed that the previous reading was over-estimated, except that refund should be made if the averaged bill has been paid.

Where customers will not accept averaged bills, arrangements should be made for securing readings on the regular reading dates or a special call made to secure an actual reading. In either case the averaged bills rendered should be cancelled, and the route sheets stamped "Do not Estimate."

As noted in the sample sticker, one of the companies through the use of printed meter dials on the back of the cashier's coupon affords an opportunity to the customer if he so desires to record his actual reading and return it to the company, and if the reading warrants it a revised bill will be rendered. If the estimated readings seemed reasonably accurate, no change is made and the customer is informed in detail by letter that the estimate was substantially correct and that any possible difference between the actual and estimated consumption will be automatically adjusted with the next bill based on actual readings. If the estimated reading was not reasonably accurate, a revised bill is rendered based upon the customer's reading and the averaged bill cancelled. If, however, the meter readings submitted by the customer do not appear to be reasonably accurate, the customer's meter is read on a special call and a new bill rendered based upon the actual reading and the averaged bill cancelled. If "Special Read" indicates that the estimated

reading was reasonable, the customer is so informed, and no change is made in the bill.

When delinquent average bills are transferred, the notation "A.B.," indicating "Averaged Bill," should be recorded opposite the amount on the current bookkeeping coupon.

For statistical purposes some companies keep a record of the number of, consumption on and revenue from averaged bills as well as a record of journal entries and corrected bills rendered; also the number of inquiries and complaints, with their disposition.

Forfeited discounts or delayed payment charges are handled in the same manner as regular bills unless an objection is raised by the customer. In this event no such charge will be assessed until the new expiration date on a bill based upon actual readings.

Collection Procedure

Delinquent statements covering average bills will be made up by the Collection Department in the usual manner. Such statements will be noted "Averaged Bill."

If it is necessary to make a collection call the collector should not insist upon payment of such bills. He will explain the averaged bill to the customer and may read the meter while he is on the premises to determine if the bill is out of line. If the customer still insists on the rendition of an actual bill, the collector will order it sent from the office. Under no circumstances should he discontinue service for failure to pay a one month's averaged bill. Where a customer owes two or more months, which includes averaged bills, and does not complain or make a payment on the bill, the usual policy for discontinuing service should be followed.

Explanation of Policy to Customer

Those who contact customers either by telephone, correspondence or personally, should inform the customers that averaged billing has been adopted as a convenience to them in that they will receive a bill each month and that household budgets will be disturbed as little as possible.

It should be stressed that any discrepancy in the estimated reading will be automatically adjusted with the next actual reading of the meter, that the payment of the average bill is optional and that bills based on actual readings will be rendered upon request.

When contacting customers use the term "averaged bill" rather than "estimated bill" so that it will not convey the idea that the company estimates bills.

Advantages of Averaged Bills

The practice of averaging bills offers many advantages as regards economies, customers relations, accounting procedures, collections and revenue. These advantages may be summarized as follows:

Economies

1. Meter Reading savings where it is the practice to pick up missed readings on call back or special calls.
2. Printing and postage savings where post cards are used.
3. Printing savings in the cost of missed reading forms.
4. Postage savings on irregular reading bills, when bills are hand delivered.
5. Labor savings in the cost of handling irregular readings on the various accounting records.

Customer Relations

1. Reduces high bill complaints, which frequently follow a bill covering a period of two or more months.
2. Insures customer receiving a bill each month, thereby disturbing household budgets as little as possible.
3. Insures a bill based upon a regular billing period.
4. Avoids annoying customers for special readings.
5. Eliminates inconvenience to customers of marking dial readings on post cards.

Accounting Procedures

1. Speeds up billing where it is customary to hold up a regular run until pick-up readings are accumulated.
2. Reduces prorating of bills necessary under certain rate schedules.
3. Decreases the number of minimum bills.
4. Decreases the number of non-routine operations.

Collections

1. Reduces the number and amount of delinquent accounts, resulting from inability to pay promptly, bills covering a period of two or more months.
2. Decreases the number of shut-offs on accounts which have become delinquent, through inability to pay promptly, bills covering a period of two or more months.
3. Effects an improvement in outstanding balances and uncollectible accounts.
4. Eliminates to a great extent special collection effort on accounts with irregular discount dates.
5. Makes it possible to utilize spare time of meter readers on collections.

Revenue

1. Accounts for the revenue in the month in which the gas is actually consumed.
2. Increases revenue by approximately the amount of the first month's averaged bills.

Due to special accounting procedures there may be some other advantages other than those noted. Naturally not all the advantages are applicable to all companies, however, those which are applicable should be given due consideration in determining the advisability of adopting the practice of averaging bills.

Disadvantages of Averaged Bills

That the practice of averaging bills also has some disadvantages is without question.

The main disadvantage is the reaction of the customers to receiving bills not based on actual readings, particularly when the plan is first adopted. However, with a proper explanation of the plan as outlined previously, and the additional provisions of adjustments with the next actual readings, optional payment and actual readings upon request, the complaints arising from refusals to accept averaged bills gradually taper off.

Other disadvantages, with certain comments thereon, follow:

1. Complaints arising from over-estimated readings due to erroneous or insufficient information furnished by meter readers. These can and should be minimized.
2. Over-estimated readings through fluctuations in the use of service and discontinuances of appliances in use, and under-estimated readings due to the installations of new appliances. These are negligible and explainable.
3. Extended absences from home due to vacations or other reasons not alone results in incorrect bills, but if the absence is extended into the collection period, may result in customer irritation through delinquent notices and routine collection activity.
4. Correct billing is more complicated where meter becomes defective or ceases to register during the period covered by the averaged bill.
5. Accounting expenses are increased somewhat through cancellations of over-estimated readings and the

resultant correspondence incidental thereto, as well as additional work involved in handling the inquiries and complaints attendant upon averaged bills, but it is stated that the increased expenses and clerical work represent only a small part of the savings affected by the adoption of the plan.

6. It is also felt that in situations where no bonus is paid to the meter readers, they may not be as conscientious in securing all possible meter readings. However, a periodic check upon their work can be made and the usual penalties enforced the same as for "curb" readings.
7. The necessity for a refund on a final bill following an over-estimated reading may be construed as a disadvantage although the favorable reaction following any refund serves to mitigate any ill-will on the part of the customer.

General Comments

While no general questionnaire was sent out to secure information pertaining to averaged bills or to determine to what extent the practice of averaging bills has been accepted, ten representative companies were contacted for the following data:

(a) Copy of Procedure Used for Averaging Bills.
(b) Advantages and Disadvantages of Averaged Bills.
(c) Total Number of Bills Rendered.
(d) Total Number of Averaged Bills Rendered.
(e) Number and Nature of Inquiries and Complaints.
(f) Method of Handling and Disposition of Complaints.
(g) General Reaction to the Averaged Bill Plan.

Eight companies reported the adoption of an averaged bill plan with satisfactory results, one company operating a municipal plant on a lease, after installing the plan in August, 1935, is considering its discontinuance pending the renewal of the lease, and one company decided against installing the plan after unsatisfactory results from a test based upon a small number of averaged bills.

The procedures in general use have been incorporated into the composite plant presented in this report, and as stated, where certain important details varied, the variations were noted.

The total number of bills rendered per month by the reporting companies using the average bill procedure ranged from 32,000 to 1,011,000 bills.

The total number of average bills rendered monthly showed quite a variance, the minimum number being 1,050 of 34,200 bills rendered and the maximum 38,000 on total bills rendered of 821,000. The smallest company with 32,000 monthly bills reported 1,475 of them averaged and the largest company with 1,011,000 monthly bills averaged 36,700. The smallest number of averaged bills to the total bills rendered was 17,000 for the year 1936 on total bills rendered of 2,962,000.

Actual results reported by the smallest and one of the largest companies are:

	Year 1936	
	Small Company	*Large Company*
Number of bills rendered	382,300	9,319,700
Number of bills averaged	17,712	164,371
Per cent of bills averaged	4.6%	1.8%
Number of customers' inquiries	730	4,380
Number of customers satisfied	331	3,600
Number of complaints	399	780

One of the larger companies commented in detail on its inquiries and complaints as follows:

Nature of Inquiries

1. Why is bill sent when house was closed or when man did not get in to read meter?
2. Must average bill be paid to ensure continuance of service?
3. May bill be cancelled and arrangements made for reading meter, so that correct bill may be obtained?
4. Can bill be cancelled and a two months' bill rendered at the next reading?

1. Refusal to accept averaged bills.
2. Bills either over or under-estimated.

Nature of Complaints

3. Distrust of "guess" bills.
4. Fear of being overcharged through unfamiliarity with accumulative operation of meter registers.

Method of Handling and Disposition of Complaints

The customer is assured that the estimate should be fairly close to the actual use since it is based on past records. He is informed that any variation will be automatically adjusted when the next actual reading is obtained. The customer is further told that if, when the subsequent actual reading is taken, the estimate is out of all proportion, the estimated bill will be cancelled and a two months' bill rendered.

An attempt is made to induce the customer to pay the averaged bill on or before the specified last day for payment, through proper explanation.

Where a customer objects to paying the averaged bill, he is asked to hold the bill until the next month, when an actual reading is made, and it is explained that if the averaged bill is paid on or before the due date of the subsequent bill, no added charge will be made.

The customer is informed that the averaged bill will be cancelled, and when a reading is obtained the following month, a bill will be rendered for the entire period.

An effort is made in a diplomatic manner by the contacting employee to discourage readings either on Saturdays, after hours or by special appointments, and the inconvenience occasioned by such calls often leads the customer to accept an averaged bill.

The eight companies reporting satisfactory results with the adoption of the plan commented as follows:

"Taking it all in all, we consider the procedure successful in our situation."

"The practice has been favorably received and the few complaints offered present no substantial reason why it should not be continued."

"We have very little trouble from averaged bills as most of our customers look favorably on this practice."

"The general reaction of customers to the practice has been very good and many customers have thanked us for the change which gives them bills every month without the disturbance of meter reading arrangements when they are not at home at the time the meter reader calls."

"We have had very little difficulty because of averaged bills—an explanation of the bill and the Company's policy usually caused the customer to accept it as rendered."

"While we have had some customers who refuse to accept averaged bills, the general reaction of our customers to the plan has been favorable."

"Out of 164,371 averaged bills rendered during the year 1936, there were only 678 instances where customers refused to accept estimated readings as a continuous arrangement."

"We installed this plan in 1933. While at the start we approximated 30 inquiries a month from 2,400 averaged bills, very few could be classed as complaints. As the customers came to understand the procedure, through explanation by our contact employees, these inquiries dwindled until now we receive so few that the plan might well be termed 100% successful."

Conclusion

The composite plan, the summation of the advantages and disadvantages and the general comments, have been based on the data supplied by the ten companies who were contacted for specific information for inclusion in this report.

Your committee does not wish to go so far as to recommend the adoption of the averaged bill plan by all companies. It believes, that under normal conditions, judging from the reactions quoted in this report, the practice of averaging bills may be successfully adopted. However, it should be realized that the success of the practice is dependent upon the thorough education of the employees concerned in the methods to be followed in each step of the procedure and that under no circumstance should the impression be given that payment of an averaged bill is compulsory.

Customer Relations Committee Report

J. GORDON ROSS,
Chairman
Rochester Gas & Electric Corp.
Rochester, N. Y.

This report refers briefly to the social and political changes which are taking place; the trend of the gas industry from an absolute monopoly into a competitive field with a resultant loss of sales of gas; the realization that we must change with the times or be changed by them.

It advocates the elimination of departmental subjective treatment of customer relations by ORGANIZING FOR BETTER SERVICE through the creation of a single one-purpose agency, reporting to the management, to act as the customer's representative.

It stresses the necessity for understanding the customer's point of view through the application of "human engineering" which weighs the emotional reactions of individuals against bare facts.

The general scope of the paper is indicated by the variety of subjects discussed, such as: regular meetings of sales, engineering, operating and accounting heads with the customer relations manager for the purpose of preventing or eliminating underlying causes of dissatisfaction; the acceleration of gas service installation schedules; a reconsideration of the time-honored practices of locating meters at point of entrance and charging for relocation of company equipment; the advisability of permitting the customer to decide the merit of his own case and make his own adjustments, etc., etc.

Customer Accounting Committee Report

W. E. Scott, Chairman
Boston Consolidated Gas Company,
Boston, Mass.

Sub Committee on Advantages of a Complete Customer History Record

F. C. Reel
Chairman,
United Fuel Gas Company
Charleston, West Virginia

As considered in this report, a Customer History Record is a complete record of the following:

1. Permanent Service Applications.
2. Security Deposit Ledger.
3. File of Guarantor's Agreement.
4. Record of Accounts Guaranteed.
5. Alphabetic Index of Customers.
6. Inactive Ledger Record.
7. Bad Debt Record.
8. Record of Unclaimed Deposits.
9. Record of Unearned Discounts Allowed.
10. Record of By-passing of Service.
11. Record of Desired Collection Effort & Experience.
12. Record of Repossessed Appliances.
13. Record of Services cut off for Non-Payment of Bills.
14. Record of Special Credit Authorization, Complaints or Information Peculiar to an individual customer.
15. Record of checks returned for insufficient funds or other reasons.

To discuss the full value of the Customer History Record, the following primary uses must be considered:

1. Credit Authorization.
2. Reducing clerical costs by consolidation of individual files and records.
3. Handling customer contacts on the basis of actual historical experience.
4. Reducing collection expense by handling all collection activities on a selective basis.
5. Reducing bad debt charge-offs.
6. Elimination of errors in account names and addresses.

In order to eliminate as much as possible duplications and errors in filing caused by variations in spelling due to transposition of vowels, illegible writing, and many other reasons, the Customer History Record is usually housed in visible equipment and filed in phonetic order, the latter being an arrangement which automatically groups similar sounding names regardless of variations in spelling. In addition to eliminating errors and speeding up filing and finding, the simplicity of this method also makes possible the use of a less expert and highly trained clerical personnel.

Briefly summarized, the advantages of a Customer History Record are:

1. A combined history of all information or dealings with the customer.
2. Elimination of duplication of one account with another by grouping similar sounding names regardless of variations in spelling caused by transposition of vowels or illegible writing.
3. Provides a permanent service application eliminating inconvenience to the customer and providing a ready record of all previous locations of the customer.
4. A simplified collection procedure, allowing a concentrated activity on particular accounts that require it.
5. Reduced charge-off of uncollectible accounts.
6. Reduced number of security deposits and guarantors and better control of those maintained.
7. A more positive and economical method of insuring correct customer's names on all company records.
8. A history of each customer allowing for individual treatment resulting in better and speedier service and assurance of better public relations.
9. Recovery of previous bad debt losses.
10. A simplified accounting of customer's security deposits.
11. Provides a record of special credit authorization complaints or other special information concerning the customer.
12. Eliminates the writing and filing of applications.
13. A history of each customer allowing credit and collection policies to be changed as warranted by economic conditions or other causes.
14. Makes it unnecessary to classify customers on company records by paying habits and changing records of this classification as these habits change or the various records are replaced.
15. Provides a record of special discounts allowed.

(Editor's Note: This report does not lend itself to abstracting, consisting as it does of descriptive outlines of the merchandise accounting methods of the above companies. For further information reference to the original report is suggested.)

Sub Committee on Disadvantages of a Complete Customer History Record

George I. Simpson, Chairman
The Peoples Gas Light and Coke Company
Chicago, Ill.

This report brings out the various disadvantages of the complete customer history record. The principal disadvantage is the excessive cost of installation and operation which

seems unnecessary because the worthwhile features of the file can be secured with less expenditure. The data in the file are duplicated from other existing records, few of which can be eliminated through its use. The disadvantages of high cost outweigh the theoretical advantages which might be obtained.

The necessity of establishing a procedure to deal adequately with customers who do not fulfill their financial obligations promptly is generally recognized. A paper on the subject of Credit History Records was prepared and presented by W. A. Hill for the Customers' Accounting Committee at the 1935 Convention.

The conclusion of that committee was, "There are many controversial points which this committee cannot hope to settle and we recommend further study and amplification." The disadvantages of Credit History Records were pronounced enough in 1935 to convince the committee that no recommendation for adoption could be made at that time. There has been so little change or improvement in the setup of customers' history records in the intervening two years that there seems to be no reason for a different decision today.

Report of Accounting Machines Committee

George F. Trexler, Chairman

Utilities and Financial Accountants
New York

The large increase in merchandise sales enjoyed by many utility companies during the past year prompted your committee in giving the general subject of merchandise accounting procedures considerable attention by stressing the use of machines in solving accounting problems.

The procedures described in this report have been so selected as to give a variety of plans now in use with the thought that either the plan in its entirety or some detail may aid in solving problems of companies contemplating the installation of new machines or making changes to existing equipment. Your committee viewed this subject from an accounting machine angle only. There are, undoubtedly, methods in use which utilize hand written statements aided only by typewriters which may compare favorably with accounting machine installations, but such installations are outside the scope of this committee's activities. The manual, or hand methods of accounting lend themselves to installations requiring a minimum of statistical data and a relatively low volume of sales.

The subject has been broadly covered to include companies making maximum use of accounting machines, as well as those making a limited use of such equipment. Only the commercial accounting and statistical phases have been covered in the seven procedures included in the report.

Central Illinois Light Company
National Cash Register Bookkeeping Machines.

Pacific Gas & Electric Company
International Business Machines Corporation Numeric Equipment.

The Montana Power Company
International Business Machines Corporation Alphabetic Equipment.

The Brooklyn Union Gas Company
Remington-Rand Co. Bookkeeping Machines supplemented by Remington-Powers Punched Card Equipment.

Rochester Gas and Electric Corporation
Elliott-Fisher Bookkeeping Machines supplemented by International Business Machines Corporation Numeric Equipment.

Cambridge Gas Light Company
Remington-Powers Hook-up Bookkeeping Machines and Punched Card Equipment.

Detroit City Gas Company
Burroughs Bookkeeping Machines.

Rate Structure Committee Report

Robert E. Ginna, Chairman

Rochester Gas & Electric Corp.
Rochester, N. Y.

There are four principal factors that influence a domestic customer's consumption of gas.

1. *Physical factors such as the type of appliance in the home.*
2. *Psychological factors such as customers' opinions of the service, rates and appliances.*
3. *Living habits of customers and related economic factors, such as buying power.*
4. *Special company policies such as home service, rental and budget plans, etc.*

In view of the importance of this subject, the Rate Structure Committee has devoted much effort this year to a study of market research and analysis. A subcommittee under the able direction of F. X. Mettenet of Chicago, assisted by R. H. Knowlton of Hartford, has prepared an excellent domestic market study for the City of Chicago.

Recently a more generalized domestic market survey was conducted in Rochester, New York. It brought to light many significant facts on the current problems confronting the industry in holding and expanding the domestic gas load. A complete copy of the questionnaire used, a summary of the most pertinent information obtained, and a special analysis of the relationship of purchasing power to the amount of consumer bills is given in the appendix of this report.

So that the entire committee could give fullest attention to the market research aspects of rates, the work of three important subcommittees will be carried over until next year.

The industry faces a continued and increasing competition for its most important class of business, namely the domestic load. Existing gas rates plus adequate sales efforts should hold gas cooking. If rate structure changes are needed to retain or increase the use of gas for water heating, refrigeration and house heating any interested executive will find a vast amount of useful material in past reports of this committee. Market surveys and sales analyses coordinated with rate studies should indicate to what extent such revisions can be justified.

Portland Gas & Coke Home Service Head

The Portland Gas & Coke Company announces the appointment of Rita Calhoun, well known Portland, Ore., home economist, as head of its home service department.

Mrs. Calhoun has held similar positions with the Southern Counties Gas Company of California and the natural gas division of the Montana Power Company of Butte. In recent years she has been in charge of the Oregon Daily Journal's home service department.

She will be assisted by Dorothy Schwarz and Mary L. Walsh of the gas company's home service department and Janet Riggs who has been newly appointed.

10,000 MEALS A DAY
Prepared by these Notre Dame Chefs on these 7 Magic Chefs. The battery consists of 42" deep sections, each 32" wide.

# of French fries, please!

THAT'S THE POTATO order when Notre Dame students sit down in their dining halls at South Bend.

5,000 lamb chops, 17,000 pounds of chicken, 2,100 pounds of fish are other typical cooking demands on the chefs at Notre Dame.

Students are fed and on their way in exactly 33 minutes — thanks to the speed and efficiency of this battery of seven Magic Chef Heavy Duty ranges, each presided over by a fast-working, expert chef.

When steak starts over the ranges, for example, it is loaded into twenty-inch skillets and Chef No. 1 at the left puts it on his fire. Cast-iron covers are removed from the stove tops so that the flames play directly on the bottoms of the skillets. Skillet after skillet passes down the line, each chef handling his bit of the operation, so that the meat is done and ready to serve as it leaves the seventh range, only two minutes after it started at number one.

Day after day, week in, week out, 10,000 meals a day are being prepared to perfection on Magic Chefs at Notre Dame University. But after all, that is just one of the more spectacular of thousands of efficient, economical cooking jobs being handled today by Magic Chef Heavy Duty ranges, broilers, and bakers. Every month sees more and more of this equipment going into America's leading school kitchens, restaurants, clubs, hotels, hospitals and other institutions.

For any manager who has a cooking problem — fuel costs too high, production too slow, food not properly done— Magic Chef has the answer. Our Heavy Duty specialists are at your service to demonstrate how to save money, time and worry with this ultra-modern equipment, using gas, the modern fuel.

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Boston • New York • Atlanta • Cleveland • Chicago
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MAGIC CHEF
AUTOMATIC
HEAVY DUTY
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Special Features

Red Wheel Lorain Oven Regulator
Cooking Top Heat Control
Automatic Top Burner Lighters
Automatic Safety Oven Pilot
Magic Chef Non-Clog Burners
Full Heavy Insulation
Gas Economy • Greater Speed
Greater Efficiency
Simplest to Operate
Easiest to Clean • Durability

COMPLETE AND FLEXIBLE LINE OF RANGES, BROILERS, ROASTERS, BAKERS

LOOK FOR THE RED WHEEL WHEN YOU BUY A

Magic Chef
AMERICAN STOVE COMPANY

The Gas Industry's Participation in the New York World's Fair—1939

By Hugh H. Cuthrell
President, Gas Exhibits, Incorporated
Vice President, Brooklyn Union Gas Company

A WORLD'S Fair commemorating the 150th Anniversary of the inauguration of George Washington as president of the United States and the launching of our government under the Federal Constitution will open in greater New York on April 30, 1939.

In other events of this kind emphasis has been stressed on the past or the present; however, the theme of this Fair is "Building the World of Tomorrow".

The site of over 1200 acres in Flushing Meadow Park is easily accessible by all means of transportation, including railroad, subway, trolley, bus, automobile, boat and air.

It is estimated that 50 million people will visit the Fair during the 180 days it will be open and facilities will be provided for a daily maximum of 800,000. The daily average attendance being estimated at 250,000.

The total cost of buildings, grounds, exhibits and permanent improvements will exceed $125,000,000.

Exhibitors from all nations, every state in the Union and every industry in America will tell their stories of the part they will play in the World of Tomorrow and they have already reserved for their use over 90% of the total exhibit space available.

Certainly displays by other industries constitute a challenge to gas. At the same time, the exposition is our opportunity—the greatest we have had for years. Our industry is so vast, gas is used in so many ways for so many purposes, it is adapted to serve the individual man in his daily life in so many directions that a gas industry exhibit can be made into one of the most interesting and informative in the Fair.

For almost two years my company has been working with the Fair officials in designing and installing a distribution system to provide gas service throughout the Fair area. Underground work is progressing very rapidly and at the present time, the Construction Department is approximately three weeks ahead of schedule and we expect to continue the extension of mains prior to all paving in the Fair area. Service will be provided by two 12" high pressure mains and it is estimated that the following distribution lines will be required: 24,000 feet 4" high pressure; 15,000 feet 6" high pressure; 9,000 feet 8" high pressure; and 3,300 feet 12" high pressure.

The estimated cost involved to render this service, which must be borne by the Brooklyn Union Gas Company and the Consolidated Edison Company of New York, is approximately $350,000.00. We believe, however, that the entire gas industry will benefit greatly by our efforts in supplying the best available fuel to the Fair. The Administration Building is now open and in use. In this building gas is being utilized for space heating, water heating and cooking. Gas will be used for all these purposes in all buildings operated for the sole use of the New York World's Fair, 1939, Inc. Ten major buildings constructed by the Corporation will be completed by the end of 1937.

We estimate that gas requirements for all uses during the period of the Fair will amount to 750,000,000 cubic feet. Here alone is an item of tremendous publicity value to our industry.

When plans for the New York World's Fair were first announced, leaders in the gas industry immediately realized that such an occasion presented an exceptional opportunity to our industry and President Russell appointed a World's Fair Committee in October 1936. This Committee after considerable study recommended that the gas industry should participate with an exhibit. It was realized at the same time that the task of organizing, financing and conducting a display large enough and sufficiently dramatic to present this giant industry adequately, was one involving a vast amount of work.

Accordingly, with the endorsement of the Executive Board of the A.G.A. and the Board of Directors of the Association of Gas Appliance and Equipment Manufacturers, Gas Exhibits, Inc., was organized as a non-profit corporation to conduct and manage the gas industry's participation in the Fair.

The affairs of the corporation are directed by a Board of Directors consisting of ten gas men nominated by the President of the A.G.A. and nine manufacturers nominated by the President of the A.G.A.E.M. We have contracted for ground space in the Home and Shelter Section of the Fair Grounds and propose erecting a group of exhibit buildings on the site.

The gas group will house a central court in which we shall portray by the most effective means the story of gas production, distribution and utilization, an auditorium in which daily events will be held and an area for a coordinated display of individual manufacturers' products.

On our grounds we also propose to erect a model home completely equipped with modern gas appliances.

To carry out this project, Gas Exhibits, Inc. has enlisted the support of the best talent in our own industry and also in the fields of design, architecture and publicity to most effectively impress the visitor with the importance of gas and its related use.

Creating and staging such an exhibit as outlined here is a tremendous undertaking, one that could not possibly be attempted by single units of the gas industry. The picture I am giving you is one of the united industry working together as an integral part of modern living today, which will be a vital factor in the world of tomorrow. In the light of this community of interest we expect your cooperation and support to carry the project through to successful accomplishment.

Presented at the 19th Annual Convention of the American Gas Association, September 30, 1937.

"The Goats on the Left?"

By John McLaverty
Supt. of Advertising
Consumers' Gas Company of Toronto

Move them over to the right—brethren of the gas industry.

For goats have a story for us and the headings of the story are—that goats give milk; that goat's milk must be kept until sold; that there is no better place for preserving it than in a gas refrigerator.

One of our meter men told us that the owner of a certain gas refrigerator was most enthusiastic about it and enthusiasm only needs to be mentioned in our presence and we are on the hunt for the story.

Our customer's combined place of business and home is on the outskirts of our city. You have to leave the pavement and take to a gravelled road to reach it.

A shed, useful if not ornamental, houses a small acetylene welding plant. Here our customer spends most of his day doing odd jobs of welding for adjacent farmers and motorists. We watched him do one of these jobs and were interested in his care and thoroughness. And he did the job while the customer waited and as, too, we waited for some moments of his time.

Telling his customer not to put the finished weld in water but to wait on natural cooling, he turned to us and told us he was ready.

We indicated the photographer we had with us, and he became immediately and volubly busy as he went toward a neat bungalow, situated about one hundred yards away from the welding shop.

"Go down the back of the hill and bring in the goats," he shouted and out of different doors came the missus, a boy and a girl who disappeared over the hill at the back of the house.

"A minute or two while I take the dirt off my face and put on a clean shirt—."

A few minutes passed, and the washed goat-keeper appeared almost simultaneously with the appearance of his flock.

The flock was not too large and we were not surprised to learn that he knew each sleek beast by name. From Bessie to Rhoda these ran but they were all Nannie to us.

Helped by his wife and family, he proceeded to tie the animals in groups to the fence, giving them enough rope to be comfortable and to be easily photographed.

He said he would feed them some of their favorite food to keep them placid, and we were rather surprised to note that the delicacy was not tin cans, but ordinary white bread.

We proceeded to take the photographs, much to the edification and amusement of a busy son and daughter.

During an interval, the lady goat-keeper regaled us, rather gloatingly, with the story of an electric power breakdown which left a neighboring goat-keeper "out on a limb", while they, with their good and reliable Electrolux, kept the milk safe and sound.

We enquired as to the sale of the milk to discover that most of it was sold in the immediate district. Goat's milk is, as you know, much stronger than cow's milk, and consequently goes further. The neighbors were mostly in the class where economy rules. Town folks who go out to him for milk have to pay a little more.

The gas refrigerator is our customer's favorite appliance, but we were not allowed to leave without hearing that the neat home also contained a gas range, a gas fire and an automatic water heater. And on our way past his welding shop as we left, he told us of the use he made of gas for preheating his larger welding jobs.

So we ask you to do as we have done;—place the goats on the right.

Perhaps there is no obvious association between the genus Caprinae (goat to you), and gas sales. But here's an object lesson of give and take in which gas has a part to play. But you must read the yarn to find out all about it. (1) The face that seems to say to the milker "Blessed is she who gives." (2) Bored and wondering what all the photographic fuss is for. (3) The home of the goat-keeper on the outskirts of Toronto. (4) Not tin cans but bread is the delicacy for these goats.

C. S. Bagg Elected Director

At a recent meeting of the Board of Directors of Montreal Light Heat & Power Consolidated, C. S. Bagg, Vice-President and General Manager of the Company, was elected a Director, replacing the late George Caverhill.

Mr. Bagg joined the Montreal Gas Company, one of the components of Montreal Light Heat & Power Consolidated, in 1897. In 1907 he was appointed Assistant Secretary-Treasurer of Montreal Light Heat & Power Company, a position he retained until 1916 when he was appointed Secretary-Treasurer of Montreal Light Heat & Power Consolidated.

His outstanding ability and knowledge of company operations was recognized in 1929 when he was appointed General Manager. In 1932 he was appointed Vice-President, retaining his position as General Manager.

Organization, Development and Direction of a Domestic Sales Force

Part 2*

By
Carl B. Wyckoff
Public Service Company of Colorado, Denver

IN formulating plans for a large sales activity of public utility nature, or in revamping previous policies, one must expect to pay for what one gets. This business is so different from other merchandising in that the sale of equipment is only a means to the end,—M.C.F. per customer being the objective.

Considering this point, it quite reasonably follows that there is a certain amount of pioneering and missionary work involved, together with a large incremental value year in and year out from all business secured and retained.

This condition has always been appreciated, but with the changing of times it is becoming necessary for the sales department more nearly to support itself. This point brings out room for much constructive thought, as it is quite possible that in the past we have allowed the pendulum to swing too far in that direction, causing us to be price conscious; whereas, if we quit whistling in the dark and put sufficient salesmanship into the business, we can not only help ourselves materially, but keep our business less subject to criticism from competitive and political sources.

By the same token it behooves us to see that the sales department is not burdened by having to carry any unfair proportion of the general expense.

Compensation

The prestige of the public utility company in the community, together with the class of merchandise which is to be marketed, should attract a very desirable type of salesmen, all things being equal.

When these men have qualified and are taken into the organization they should feel that they will not only be properly remunerated for their efforts, but that they are entering into a permanent and dependable position; one into which a man is justified in putting his whole heart and soul for the rest of his life.

Compensation set-ups that bring the best results are not the simplest by any means, but they are well worth any extra clerical work they may entail.

A sound compensation structure will total approximately 22% of the net merchandise sales. A judicial division or spread of this amount is imperative. No two men are identical in value, so the system must be such as to enable each man to earn in direct proportion to his ability and application. The first bracket should consist of a flat salary or preferably, a guarantee of from $75.00 to $100.00 per month. This item should not be subjected to charge backs or anything else that might dampen a man's enthusiasm during a good month. Thus with his basic expenses cared for and a liberal schedule of commisisons, bonuses, etc., each man will take out of his job in direct proportion to what he puts into it.

In addition to this guarantee, a simple structure will pay a straight ten per cent commission (more or less) on net sales, subject to the same charge back, a straight unit commission varying in proportion to the load-building value of the equipment sold, and a reasonable per cent of any extra cash collected in advance, over and above the regular terms. This last item is one that is well worth considering, as an activity of this nature requires considerable capital. It is true that all term payment contracts include a carrying charge, but ours is not a financing business any more than can be helped. Further, the larger the down payment, the more apt the job is to stay sold.

Salesmen are only human and will not exert themselves to collect any more than is necessary. However, if some appreciable inducement is injected into the picture, they will certainly become interested.

In lieu of the straight ten per cent commission bracket, some very successful companies have paid on the gross profit basis, 40% of same having been found to be fair to both parties. This entails some additional accounting, but it is well worth it. The idea should have quite an appeal to the company, as it is a great protection as compared to a straight commission, while with the salesmen, inasmuch as it is a matter of money in or out of his pocket, he will be discouraged from giving too large allowances on trade-ins, or making any other cuts on his net selling prices. Thus price resistance is overcome and both parties are assured a material benefit. In fact, it is quite possible that this system of compensation may be the controlling factor in keeping a department out of the red.

In addition to the above form of compensation, approximately 2% of the estimated sales expense should be reserved for day-to-day cash-on-the-barrel-head bonuses to fit in with various sales campaigns.

Transportation expense is ever a problem for the salesman, and paydays are frequently a long way apart, so the prospect of a dollar or two in hand at the morning meeting will frequently spur a man on. Such a plan will get the most results out of each individual salesman and keep them all working, while other plans wherein the same amount of money might be given as a grand prize to the three top men, for instance, would at once place more than half of the men out of the running and thus only stimulate the enthusiasm of a limited few, if any.

One with an imaginative mind can devise contests wherein the organization can be kept on its toes continually. Space at this time does not permit going into detail with various plans, but a few can be mentioned:

1.—A theoretical race across town wherein a certain amount of merchandise sales advance the runner a city block.
2.—A dart throwing contest as described in these columns recently* wherein each storage

* *Part 1 appeared in the September, 1937, issue.*

* *August, 1937, Page 16.*

"Smilin' thru"

TO MORE SALES WITH

ROPER

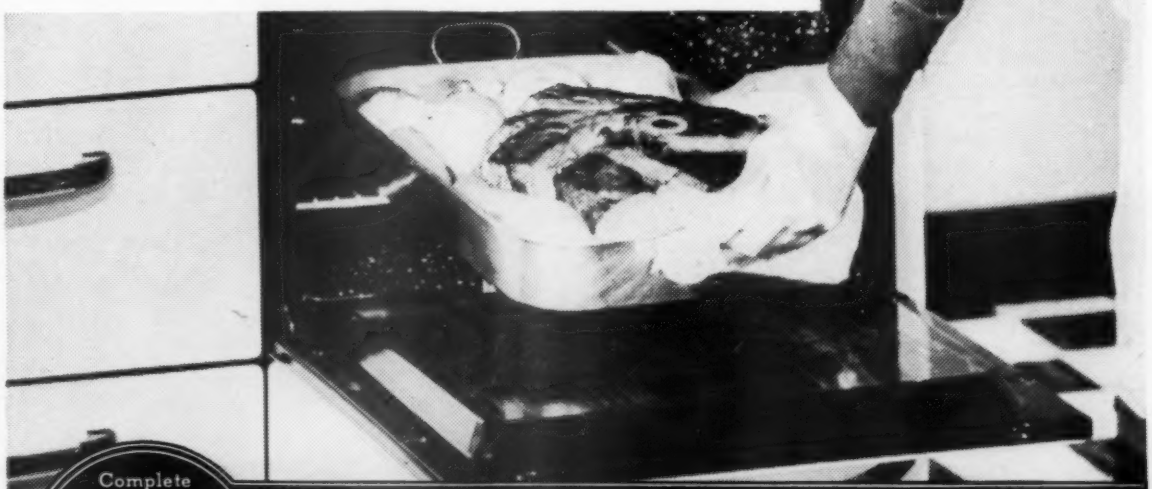
GAS RANGES

*Roper Leads Again With New Promotion Material

Start "Smilin Thru" to more gas range sales with this dynamic new "Smilin Thru" campaign. Newspaper ads, folders, broadsides, display, and other attractive material, available for your use locally, tie up with national magazine advertising.

This campaign, publicizing Roper's superior complete cooking service, will bring you extra profits. If you have already received this campaign plan, put it to work. If not, write for the complete plan today.

*Ask about the sound film "Sunshine in the Kitchen." It's a real selling plan.



Complete Advertising and Sales Promotion Helps and Service yours for the asking . . . Let us show you

Tie in with the ROPER National Advertising Program

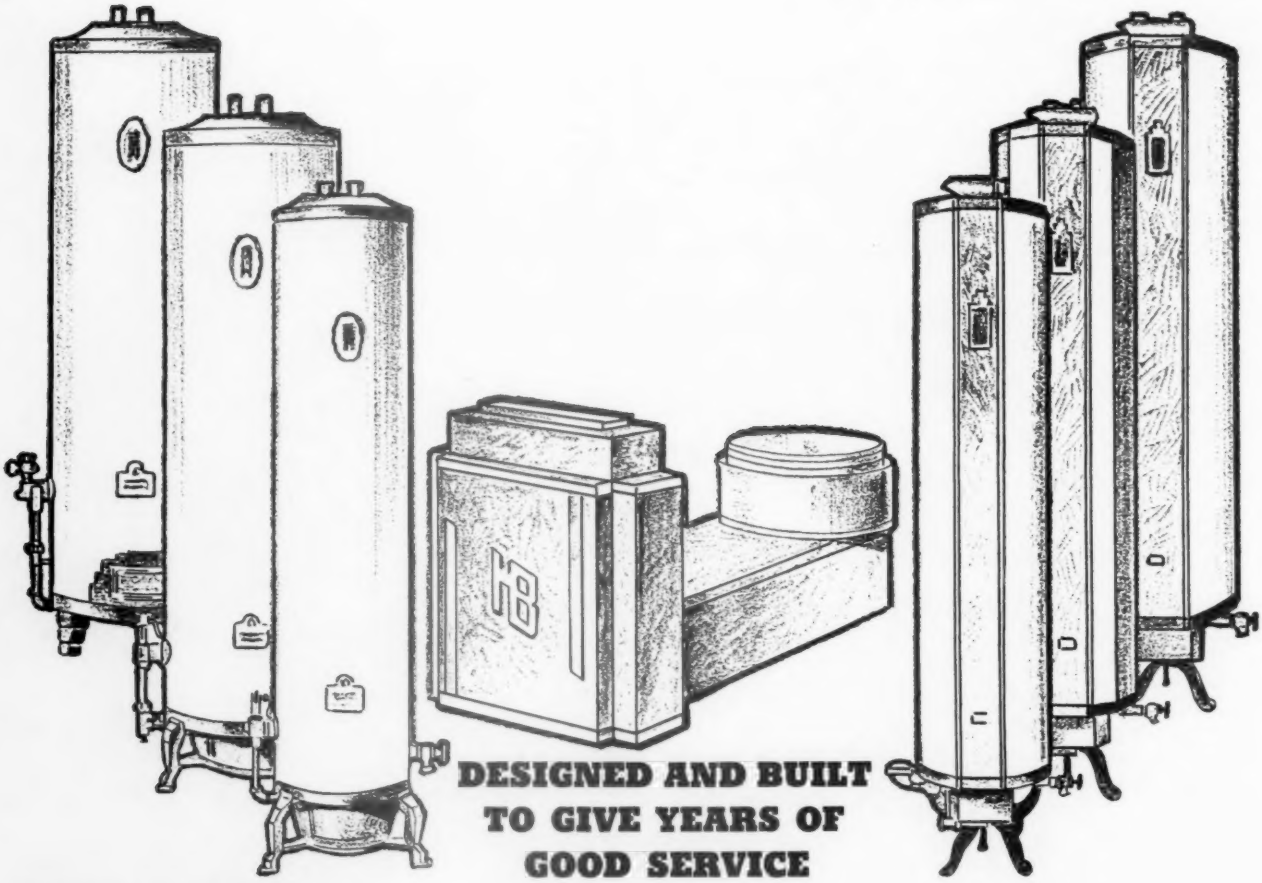
ROPER RANGES ARE IDEAL FOR USE WITH ANY TYPE OF GAS, INCLUDING BOTTLED GAS

GEO. D. ROPER CORP.

GENERAL OFFICES AND PLANT: ROCKFORD, ILL.

WAREHOUSES:

San Francisco Los Angeles Dallas Kansas City Chicago Washington Atlanta Cleveland Newark Philadelphia



DESIGNED AND BUILT TO GIVE YEARS OF GOOD SERVICE

HANDLEY-BROWN "U" TUBE HEATER

Galvanized or Everdur Tanks

No. 45 Large Demand
400 Gallons Per Day Capacity

No. 50 Low Input
145 Gallons Per Day Capacity

No. 30 Low Input
90 Gallons Per Day Capacity

High Efficiency From "U" Tube Heating Method

Long heat travel allows water to absorb practically all the B.T.U.'s generated by the gas burner.

This high efficiency makes it possible to sell the low input heaters that are favored by the mass market because of the assurance the customer has that hot water service will not exceed a definitely stated sum per month.

H-B House-Heating Burner

1-R, 50 M Min.—300 M Max.
2-R & 2-S, 100 M Min.—300 M Max.

The burner head diffuses the flame directly to the lower side walls of the heater without the use of fragile radiants. Good flame scrubbing action. All parts requiring adjustment or possible change handily located in front under the attractive modern styled control cover. Installation quickly and cheaply made.

MIRRO-SHELL Conversion Heater

MS 40-5-A for 40 gallon tanks
120 Gallons Per Day Capacity

MS 30-8-A for 30 gallon tanks
160 Gallons Per Day Capacity

MS 30-4-A for 30 gallon tanks
85 Gallons Per Day Capacity

An Efficient and Attractive Conversion Water Heater

Through a revolutionary new method of radiating heat into water, Mirro-Shell cheaply and quickly converts range boilers into highly efficient automatic heaters.

A new water heating market is opened by its low first cost and small operating cost.

Very attractive. Morocco finished metal jacket in old ivory. Front panel light green crystalline finish, top and bottom bands black.

HANDLEY-BROWN HEATER CO.

JACKSON, MICHIGAN

Bull's-Eye Target Storage Water Heater Sales Contest, Public Service Company of Colorado, Denver, June 1937.

water heater sale entitled the salesman to throw a dart at a large board upon which discs the size of a dollar were placed. These discs were worth from 50c to $5.00 when hit by the thrower of the dart.

3.—Baseball games wherein certain sales are rewarded with base hits ranging from singles to home runs.

4, 5 and 6.—Golf games, horse races and prize fights arranged along similar lines.

7.—Political contests wherein the men advance from precinct captains to U. S. Senators, etc.

While all such contests should carry day-to-day or semi-weekly, at least, cash-on-the-barrel-head bonuses, still the results should be accumulative and should reward each man additionally at the end of the month in direct proportion to his sales production. Another monthly sales program which produces splendid results is to practically pit each man against himself. There are always a large number of territories and men that cannot possibly come out at the top of the group, so the smart thing to do is to get these men into action where they are encouraged to do better. With this thought in view much can be accomplished by a set-up wherein each man is paid a daily cash-on-the barrel-head bonus on an upward scale. For instance, nothing on each of the first two storage water heaters and househeating jobs, 50c on the second, and so on until he gets $2.50 on the tenth and all others. This scale can be devised on a reasonable expectancy and you will certainly have your crew mighty busy at the end of the month when they are in their higher brackets.

All territories must be fully and unreservedly protected. Each man is entitled to full consideration for every sale made in his individual district, regardless of whether it results from his cold turkey canvass or from a voluntary call at the office from the customer.

Development

One is quite fortunate to be able to select and gather together a group of good material for gas salesmen, but there yet remains the job of developing and training them for your specific line of work. It is not necessary to train househeating salesmen to a point where they are competent heating engineers, but it is essential that they have a good general knowledge of the subject so that they may present and discuss the matter intelligently. Therefore, it is well for them to spend the first two weeks with the househeating engineer and his assistants. This apprenticeship of surveying and estimating homes will give them a very good idea of what it is all about. After this period with these men and also with the straight domestic men, each one should put in a week with some older employee at straight canvassing, together with general routine work. This will enable him to get his feet on the ground and prepare him to start out for himself. The burden that the househeating salesman assumes is that of locating the prospect from the multiude and by so presenting his story as to arouse interest and sell him upon the idea of househeating. When this is done the job should be referred to the sales engineers who send out and get a plan of the home, together with the necessary information concerning the construction of the house, type of heating plant and the circulating system. This information having been secured, the engineer lays out the job and advises the salesman what equipment is required, and the improvements needed, together with the selling price of the job and the operating costs.

All jobs should be sold as high standard as possible and it is important to overcome price consciousness with the men. When they have a good working knowledge of their business they can present the true picture. Of course it is not possible at all times to sell the job from a 100% technical point of view, still the customer should appreciate that he will get in return for his money in direct proportion to the type of job he buys.

The necessity of having sold the househeating jobs right was well emphasized during the recent depression when it was not uncommon for a number of companies to lose one half of this type of business, while a few of the more fortunate ones lost comparatively few jobs. This was not due to luck, but was directly due to the jobs having been sold so efficiently that their operating costs over and above previous costs with other fuels were not sufficient to effect the household expense seriously.

Naturally, wherever possible, gas designed equipment should be sold; but where this is not possible, it very frequently happens that a good conversion with the proper revamping

In this salesmen's meeting room are four long tables where salesmen gather in groups of eleven, with a supervisor at each table.

of the circulating system, especially return air ducts, will make a very satisfactory job.

Central heating plants are, of course, the commonly preferred means for heating the entire house; but in many of the more modest homes they cannot be afforded, and in some cases they are not possible due to construction or lack of basements. In these latter cases zone heating is required. In some, circulating heaters will suffice; but the general experience has been that when such a heater with sufficient capacity to heat the major part of the house has replaced the old family heating stove, the customer expects too much and is not satisfied. He expects a better distribution of heat than he has been accustomed to having. Also, with too much capacity in one location, the circulation is too fast, thus resulting in drafts on the floor. Again the mere production of an abundance of heat in one spot or zone does not by any means insure that it will circulate to adjoining zones. Thus a large number of these modest homes should have the heating units better distributed. One answer to this is the floor furnace which is now receiving splendid public acceptance. Such units are available in such a large range of capacities and types that any house where a central heating plant is not adaptable can be economically equipped.

We have in the preceding thoughts apparently digressed from the development of the househeating salesman, but this has had its intent. The discussions that arise between the salesman and the heating engineer when the house plans are brought in, are most valuable and contribute more than anything else towards his education.

Direction of Sales Force

The accompanying photograph shows a section of the meeting room for the domestic gas salesmen in one large property. Here the men are divided into four groups of eleven men and a supervisor each. Four long tables are provided and each group has its table. This arrangement is quite convenient and works out much better than just the chairs only. The department head's temporary desk is seen in the front. The large bulletin board in the foreground is a very important feature of the operation of the department. The individual salesmen's names are painted on the board in the horizontal lines, while the calendar days appear vertically. The month's returns are carried accumulatively from day to day for each man, and each supervisor's crew is totaled. Another similar board carries the accumulated monthly results throughout the year. In this manner each man's record stares him in the face day in and day out as either something to be proud of, or else like a sore thumb. Such things as these boards do much to urge a man into action, for very few men are content to look at a poor standing day in and day out. They will either improve or quit of their own volition.

The morning meeting is imperative and is the key to the day's work to a large extent. It must start promptly, and as a rule, be interesting and short. However, on inclement mornings very frequently considerable time can be spent advantageously. Generally, the meeting should be over early enough for the men to start for their territories before 9 A.M. since the morning hours are the best for canvassing. People are not as approachable, or as easily contacted in the afternoon. Therefore, the latter part of the day and the evenings should be reserved for definite appointments.

The roll call should be responded to by a statement of sales made the previous day. This can be followed by any special announcements that are to be made. Points that require discussion continually come up and take some time. Pep talks, and the turpentine gun should not be used too often or the meeting becomes a bore. Educational talks should be injected here and there. A good joke or a timely wise-crack now and then won't hurt as long as the meeting is not turned into a play house, for a good laugh certainly does no harm.

By all means do not take this opportunity to vent your spleen. If the salesmanager's stomach is out of order, or he is in the dumps, it is much better to dismiss the meeting summarily, for it is far better to confine a grouch to one man than to spread it to a large number. Rarely should the group be taken to task as a whole and sent out on such days with their spirits low. It is much better to try to lead or inspire men than to drive them. Again it is quite well for the men to have some time to discuss special issues with their supervisors before they leave the building. It might not be out of place at this point to state that supervisors should be what the term implies, and not "SNUPERVISORS." These men will get much better results by assisting and advising their men, thus co-operating openly and wholeheartedly, rather than spending their time spying on their men or trying to make dictators out of themselves. It is assumed that your men have been properly chosen and that they are keen and alert, thus eliminating the necessity of the above policy. Good men will spend enough time canvassing to keep the balance of their time occupied with appointments for further discussion, and the closing of deals with their prospects. They will know their customers and their needs, so such a policy as is worked in many other lines whereby a group of men are directed as to exactly what streets they will work on on certain days and what they will say, is all "Poppy-cott" in our business. After having chosen good men and taught them the business, leave them to their own initiative. If necessary, cull out the weak ones now and then, but one should not create the feeling that he is continually thinking of firing some one. Far better is it to encourage and assist the weaker than to operate with a feeling of unrest.

A good sales organization has a very small turnover in manpower, when well established. Good men must be satisfied so that their services are retained and poor men should be made better. The old saying "more to be pitied than censured" is reversed with the salesmanager who is continually changing men, for there is surely something wrong.

Petroleum Experiment Station at Bartlesville, Oklahoma

The new building of the Petroleum Experiment Station of the United States Bureau of Mines at Bartlesville, Oklahoma, will be dedicated on October 19th and 20th.

The Bureau of Mines, as it relates to the oil and gas industry, is a research organization whose function is to provide answers to the many technical and economic questions that are arising continually in the industry. Its staff of specialists have access to data which are not available generally to the competitive units within the industry, and consequently the Bureau is especially prepared to analyze technical problems in which economic considerations are important factors.

The Station at Bartlesville was founded in 1917, and since that time several hundred reports dealing with all branches of the petroleum and natural-gas industries have been published by the Bureau of Mines. These reports include studies of the problems involved in drilling and production, transportation, refining and chemistry, and the use of oil and gas and their products. Particular emphasis is laid on reduction of waste, on safety and efficiency, and on economic development.

Validity of State Laws, City Ordinances, and Public Utilities Commission Regulations

By
Leo T. Parker

Attorney at Law
Cincinnati, Ohio

FREQUENTLY gas companies become entangled in litigations involving the right of states, municipalities or public utilities commissions to vary, modify or repeal laws, regulations or contracts with respect to the sale and distribution of gas.

Various courts have held that a municipality is a political subdivision of the state, and that it is created as an agency for the state for exercising only such governmental powers of the state as are entrusted or delegated to it.

It is important to know that laws are subject to variation, modification and repeal which (1) confer governmental powers on a municipality; (2) vest in a municipality real property to be used for governmental purposes; (3) authorize a municipality to manage property, or (4) exempt a municipality from taxation.

For example, in Pawhuska v. Pawhuska Gas Company, 250 U. S. 395, it was disclosed that a state law authorized municipalities to grant franchises. Subsequently, a city granted a franchise to a gas company to use the streets and supply gas to the city and its inhabitants. In view of the governmental powers of the city at that time, the city alone had authority to regulate the charges for gas and services to be rendered by the gas company.

Later the State Legislature enacted a new law giving the right to the Public Utilities Commission to regulate rates to be charged for gas. The Public Utilities Commission increased the rates, and the city contended that this new law was void because it took power from it and unlawfully delegated the same to the Public Utilities Commission. However, the Supreme Court of the United States held the new law valid, saying:

"The municipality, being a mere agent of the state, stands in its governmental or public character in *no* contract relation with its sovereign, at whose pleasure its charter may be amended, changed, or revoked, without the impairment of any constitutional obligation. . . ."

Street Rental Tax Varies

Considerable controversy has existed from time to time as to what is a "reasonable" gross income tax which may be charged a gas company for use of city streets and alleys.

It is true that the use by any company of the surface of the streets, either for trackage or for poles carrying wires, is a servitude which interferes far more with ordinary pedestrian or vehicular traffic than is caused by underground pipes or conduits of any sort. Therefore, such taxes paid by gas companies should be considerably less than those paid by trucking companies, telephone companies, telegraph companies, and the like.

Another important point of the law is: At expiration of a taxation contract, made at the time the franchise was granted, what new taxation rate is reasonable? Generally speaking, it is determined by present conditions and by comparison with rates included in recent contracts made with other public utility companies.

For example, in City of Spokane v. Spokane Gas & Fuel Company, 47 Pac. (2d) 671, it was shown that in 1904 a municipality granted a franchise to a gas company authorizing the laying of gas mains in the streets for the purpose of distributing gas. The franchise was accepted by the company, and in due time a system for the distribution of gas was installed pursuant to the franchise. The franchise was granted for the period of forty-one years. A clause in the franchise ordinance provided that "in consideration of the granting of the franchise the company shall for the first twenty-five years pay to the city an amount equal to two per cent of the gross receipts from the sale of gas."

Under this clause the gas company paid to the city for the twenty-five year period ending June, 1929, two per cent of its gross receipts specified in the ordinance.

No payments were made after that time, and not until several years after 1929 did the city pass another ordinance requiring the gas company to pay from 1929 thereafter the sum of two per cent of its gross receipts for use of its streets and alleys. The gas company appealed to the higher court on the contention that two per cent of its gross receipts was too much to be paid by it for use of the streets, in consideration of what other public utility companies were paying under ordinances passed before 1929. The gas company introduced testimony proving that a franchise was granted by the city during the year 1924 to a telegraph company requiring it to pay to the city five per cent of its gross revenue. Under another franchise, granted in 1905 to the telephone company, the grantee pays $3,000 a year, in addition to furnishing to the city twenty-five free telephones and allowing the city exclusive use of a cross-arm on each pole maintained under the franchise. Under another telephone franchise granted in 1915, one per cent of gross revenue was to be paid, and 100 free telephones furnished to the city. A franchise was granted in 1914, granting the use of the streets for the purpose of distributing heat. This franchise called for the payment of one per cent of the gross earnings, with a minimum of $2,500 per year. Under its franchise, the heating company uses 5¼ miles of underground conduits in the business district, and the gas company maintains 155 miles of gas mains.

Also it was proved that companies operating under gas franchises in several other cities within the state pay to their respective municipalities anywhere from one to two and a half per cent of the gross income, while in many other cities no payment at all is made.

In consideration of this testimony the higher court held that payment by the gas company of one per cent of its gross receipts was sufficient and reasonable. This court said:

"Rates fixed in other franchise ordinances are to be accorded weight. . . ."

City Street Rental Ordinance Valid

Various courts have held that municipalities may charge gas companies and other public utilities rental for use of streets, providing: The state constitution prohibits municipalities from granting irrevocable privileges; or if the state constitution does not contain this clause, then the city may charge rentals for use of its streets unless the franchise granted the gas company clearly prohibits the city from doing so.

For illustration, in Municipal Gas Company v. City of Wichita Falls, 88 S. W. (2d) 608, it was disclosed that a municipality passed an ordinance requiring the gas company to pay to the city five per cent of its gross income for rentals, or privilege of further use, of the streets in which were installed many years previously the necessary gas mains, and other apparatus and equipment.

The ordinance further provided that "a corporation which shall operate without the payment of rentals provided for in the ordinance shall be subject to a penalty of not less than $100 nor more than $200 for each and every day that it shall conduct its business using and occupying the streets and alleys."

The gas company filed suit and asked the court to grant an injunction against the city to prevent it from enforcing the ordinance. The counsel for the gas company argued that the ordinance was void because the company had acquired and for many years owned and operated under franchises granted by the city. It was alleged that to require the company to pay the rentals provided for by the ordinance would result in an actual loss to the company for the reasons as follows:

Because the franchises amounted to contracts between the company and the city and the ordinance was an unlawful attempt to abridge the company's legal rights by reason of large investments; (2) because its franchises were private property within the meaning of the Fourteenth Amendment; (3) because its franchises were private property within the meaning of the State Constitution and the enforcement of such ordinance would deprive it of its property without the process of law, contrary to the provision of the Constitution; (4) because the ordinance was an unlawful attempt by the city to nullify, amend, and abridge the provisions of the franchises which it had theretofore granted and which were owned by the company; and (5) because such ordinance was void and unenforceable because it imposed upon the company oppressive, unreasonable, and exorbitant charges which had no relation to the cost to the city of regulating, controlling, and supervising the company's business, and the fee exacted by the ordinance had no reasonable relation to the value, extent, and nature of the occupation and use by the company of the streets and public thoroughfares in such city.

However, the testimony proved that the gas company's franchise did not provide that the gas company was privileged to use the streets and alleys without charge because the State Constitution contained a clause which prohibited municipalities from granting irrevocable privileges. Therefore, the higher court held the ordinance valid, saying:

"Even though appellant (gas company) is able to show that it is operating under the Culbertson franchise, nevertheless the appellee (city) is not to be denied the right to charge for the use and occupancy of the streets, although the franchise does *not* so provide, because the municipality is prevented by the terms of the State Constitution from granting irrevocable or uncontrollable special privileges."

Validity of Contracts

According to the provisions of the United States Constitution no law, ordinance, or regulation is valid which attempts to vary or rescind a valid contract.

Therefore, it is important to know that a public service commission is not legally empowered to invalidate or alter contracts made by gas companies unless the effect of such contract is discrimination between consumers of gas, under which circumstances the contracts obviously are invalid.

For illustration, in Huntington Gas Company v. Public Service Commission, 143 S. E. 357, the testimony proved that a gas company supplied gas to municipal consumers. The company entered into a contract with a distributor of gas by the terms of which the latter was required to bear the loss in leakage until the pipe lines were repaired and put in first class condition.

The Public Service Commission entered an order disregarding the contract contending that its effect was a discrimination with respect to the distributor's consumers.

However, the court held the commission without the proper authority to invalidate a contract of this nature, saying:

"The commission's power of regulation may disregard any contract deemed to be at variance with the needs of the service as determined by it, or which is discriminatory in character. But is this contract at variance with the needs of the service, or is it discriminatory in character? We are inclined to believe not. . . . The commission's belief, drawn from its fund of experience, is *not* evidence, and an order of the Public Service Commission which is *without* evidence to support it *cannot* be upheld by this court."

Retail and Wholesale Regulations

It is well established law that a gas company which supplies gas to consumers cannot legally refuse to supply gas to all who demand it, under reasonable conditions and regulations. However, this rule of the law is not applicable to wholesale distributors, such as gas pipeline companies.

In other words, a public utilities commission may not impose upon a public utility, which sells wholesale, as a condition to the granting of a certificate of public convenience and necessity, the requirement that it also furnish service to all who require and demand service. Therefore, a gas pipe line company may select its customers and it may legally refuse to supply gas to municipalities, if it desires to do so.

For example, in Chicago District Pipeline Company v. Illinois Commerce Commission, 197 N. E. 873, it was disclosed that a certificate of public convenience and necessity was granted by the Public Service Commission to a pipeline company. The order of the Commission permitted the company to maintain and operate its lines upon condition that it would convey, deliver, and sell gas at wholesale to corporations, both municipal and private, engaged in the sale and delivery of gas to the public.

The order entered by the commission was predicated upon the assumption that the pipeline company, as a public utility, could not limit the scope of its public engagement to the sale of gas to only privately-owned public utility companies, and thus, in effect, discriminate against municipal corporations. On this point it reasoned that once a public utility dedicates its property to a public use, it thereafter becomes affected with a public interest.

The pipeline company appealed to the court and demanded that the commission issue a certificate permitting it to sell gas at wholesale exclusively to privately-owned gas companies.

The higher court ordered the commission to issue the certificate on this basis, saying:

"No unlawful or unreasonable discrimination could therefore result in appellee's (pipeline company's) failure or refusal to extend its service beyond the scope of its publicly professed obligation. Nor can any legal sanction be found to authorize the commission's attempt to withhold a certificate of convenience and necessity from appellee (pipeline company) until it agreed, as a condition subsequent, to sell gas to municipalities."

Order to Extend Service

Obviously gas companies are obligated to extend their service within municipalities where such extenison is reasonably necessary in consideration of the demands and requirements for additional service.

However, usually the higher courts will uphold a Public Utilities Commission's decision, not requiring a gas company to extend its service lines where it is shown that the extension of the service is not reasonably necessary, or will result in financial loss to a competing company.

For instance, in Huntington v. Public Service Commission, 149 S. E. 677, it was disclosed that a gas consumer filed a complaint with the Public Utilities Commission and requested it to require a gas corporation to extend its mains at a cost of aproximately $1000 to supply gas to a manufacturing plant. At the hearing it was shown that a competing gas company furnished gas to the manufacturer at higher rates than those charged by the gas company whose services the manufacturer demanded.

Evidence was introduced proving that both gas companies were owned by the same corporation. Therefore, the higher court entered an order requiring the company to extend its mains to supply the manufacturer, bcause the two companies were not considered actual competitors. This court said:

"It therefore appears now that the two utilities are subject to one ownership (for all practical purposes), that they are under one management, and that community of interest is fully established . . . When we look through the veil of corporate entities . . . the danger of ruinous competition and economic waste is not a factor in this case. There can be no real competition between corporations which are owned by the same party and are under the same management."

Bell Joint Clamps

(*Continued from page 37*)

without binding. The maximum tolerance allowable between the pipe and the follower ring from the data appears to be about ⅛".

A number of companies use a torque wrench to determine the proper tension on the bolts while in other companies the workmen determine the proper bolt tension by the feel of the wrench. In other companies the workmen use a torque wrench until they learn the "feel" and then an ordinary wrench is used.

One company stated that torque wrenches tend to get out of adjustment, and if torque wrenches are used they should be calibrated periodically.

Cement Joints

Only a few of the replies from the companies contacted gave specific recommendations on clamping cement joints. This was to be expected since cement joints are not as prevalent as lead joints. It would appear from the limited data presented that the same general principles employed in the "preparation" of a lead joint for clamping apply also to cement joints. The other items of the specifications for installing clamps on lead joints, of course, apply to cement joints.

Gas in PWA Project

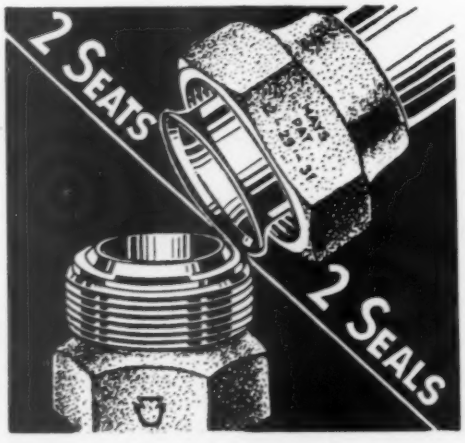
Gas for every utility service in the home except lighting and water is provided in a PWA low income project at Enid, Oklahoma which opened August 28. All kitchens are equipped with gas refrigerators and gas ranges, the entire project is heated from a single gas-fired heating unit and gas-fired laundry equipment is available for all families.

James M. Kobabe Joins Lee B. Mettler Co.

The Lee B. Mettler Co., manufacturers of Mettler entrained combustion gas burners, announces that James M. Kobabe has joined the organization as Executive General Manager.

Mr. Kobabe has been affiliated with the Mettler Co. during the past eleven years as a direct factory engineer, with a general distributorship of Mettler products in the Central States.

Mr. Kobabe will be located at the General Offices of the Lee B. Mettler Co. in Los Angeles, Calif., dividing his time with the Chicago office and other offices, as may be necessary. Henceforth, the Chicago office of the James M. Kobabe Co. will be in charge of Mr. Earl E. Litz, who has had many years of experience in many branches of the gas industry.



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SAVES on Purifying Costs by removing a greater amount of H_2S . . . and by purifying a greater number of cubic feet of gas per pound of Oxide.

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Obviously—if these statements are correct, you can save substantially on your gas purifying costs. Investigate, then—we can prove them to you to your entire satisfaction. Write—there's no obligation.

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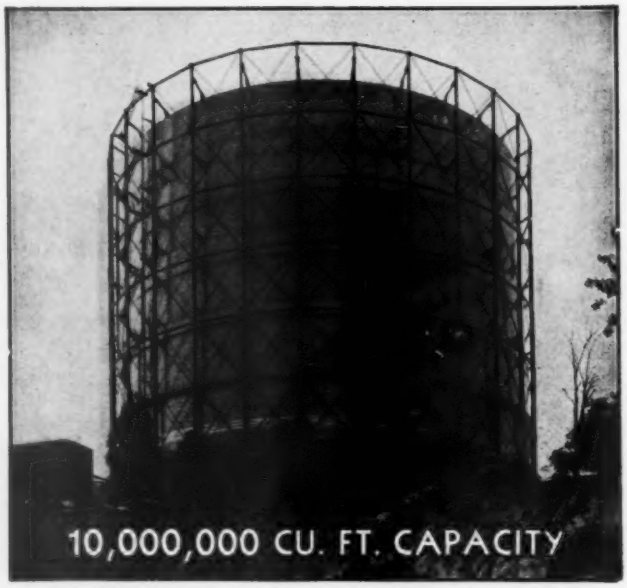

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AMBLER, PA.

Pipe Corrosion and Coatings

Coating Requirements

By Erick Larson

Part 16

Soil Stress

PROTECTION should be required to resist soil stress. Soil stress is the dynamic force exerted by a soil on any object partly or wholly covered by the soil. Soil stress turns the smoothness of the original coating into a variety of patterns and designs. The frequency of occurrence and the intensity of soil stress action are as variable as the corrosion of metals. The effect of soil stress is to distort or to displace the coating material either or both of which may occur over small or large surface areas.

Displacement of the coating occurs when soil particles or some soil ingredient is forcibly held against and gradually enters the coating displacing the coating material. Such displacement may occur until no protection

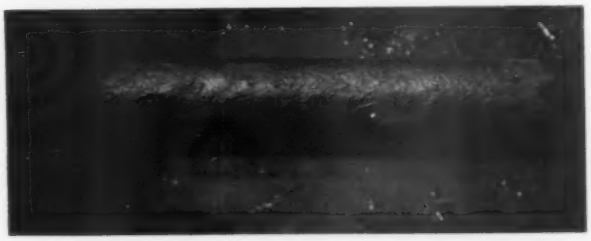


Fig. 1—Soil stress effect after 3 years in sand and meadow bog. Combination of displacement and distortion. 162.5 F. melting point enamel.

remains between the pipe and the soil. The displacement type of soil stress is limited in the area damaged by the size of the particle displacing the coating. Displacement is first noticeable through a roughening of the coating surface which action may totally destroy the original texture or the change may occur in more or less numerous spots between which the original appearance is preserved. Continued exposure to the soil stress will deepen the roughened portions producing small craters having an appearance similar to the pits produced on pipe by corrosion. The appearance of the crater when displacement is due to other than soil particles depends upon the size and shape of the material. The result is mold of the material entering the coating. Conceiving of most coatings as plastic material, which it usually is, facilitates conception of the results produced by soil stress. The most usual appearance of the coating from the displacement type of soil stress damage is that of a honeycomb although not as regular in design.

The soil stress in this honeycomb type results in a displacement of coating at the affected location but no general distortion or displacement. The coating displaced may increase the thickness immediately adjacent to the action an observable amount or may distribute the material over a sufficiently large area so that the increased thickness is not visually apparent.

Soil stress of the displacement type has been observed in soils varying from a white beach sand composed of fine grains to rock. Penetration in the beach sand was not as rapid as in other types but 164 degree F. melting point enamel was penetrated to the steel in numerous places within four years. This failure occurred over several miles of 6″ pipe. The pipe depth in this instance varied from just below the surface to three feet. The fact that beach sand has produced a soil stress in one instance even though the area of failure was extensive does not necessarily indicate a possible damage in all sands but does emphasize the difficulty of predicting the success of protection when shielding is not used.

The second type of damage from soil stress, distortion, affects comparatively large areas of coating compared to the single area of a crater resulting from displacement. Soil stress distortion may be defined as the movement of comparatively large areas of coating relative to the pipe on which it was placed and also a non-uniform movement relative to the coating itself in the disturbed area. As a result of the non-uniform movement the coating is distorted into various patterns most of which have a wavy cross section. The appearance is frequently that of a cloth after it has been pushed into a confined space on a smooth surface. The original shiny appearance of the coating surface is frequently preserved during the action or may remain smooth but dulled.

The cause of the distortion is that the gripping power of the soil exceeds the adhesive power of the coating to the pipe or the cohesive power of the coating particles

Fig. 2—Displacement type soil stress in a gravel loam mixture. Note appearance at left similar to distortion effect but caused by application.

producing a slow movement of the whole coating from the original position.

A condition apparent in other phases of coating investigation is that the internal cohesion of an apparently hard coating is frequently weaker than the bond between pipe and coating. As a result if breakage occurs the place of cleavage may be in the primer, between primer and coating or within the coating itself. The same result can more easily occur in coating having the consistency of grease. The distortion type of soil stress

may not cause actual rupture although such a result is not uncommon but there may be a differential movement between or in any of the layers mentioned. It is apparent that strong cohesive and adhesive qualities are essential to provide resistance against soil stress.

The differential movement may have stretched the coating at the bottom of some of the waves beyond the tensile strength and cracks appear. The breaking of the bond between pipe and protection if permanent affords space for moisture to collect.

The extent of damage from either type of soil stress and the period in which it occurs are not comparable as a soil producing one type does not ordinarily produce the other. Both types cause extensive damage and localize corrosion on the comparatively small area of bare metal exposed in the pit crater or crack.

Coatings without shields have been damaged by both types of actions so that bare metal was exposed in less than a year. Failure of the coating from soil stress in one year is rather unusual but not unknown. In soils of moderate soil stress unshielded coatings frequently provide only a few years protection from corrosion. Complete penetration of an unshielded coating caused by soil stress in beach sand as previously mentioned occurred in four years. There have been observed instances where unshielded coatings have been undamaged

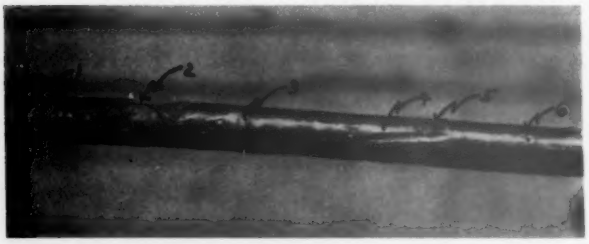


Fig. 3—1. Droplets originated during application. 2. Steel pipe penetrated where coating lacked continuity. 3. Bubbles originated during application. 4. Displacement caused by pipe resting on object. 5. Displacement causing exposure of large area of metal. 6. Displacement causing exposure of small area of metal. Note excellent condition of enamel between described points.

by soil stress for ten years and therefore indefinite resistance to such action may be expected. However, the extensiveness of such lack of soil stress damage is questionable.

The soil box test has been developed to provide an accelerated determination of the distortion produced by soils but no laboratory methods are available to predict the effect of the more commonly occurring displacement type of soil stress. The unpredictable nature and frequent occurrence of the damage from soil stress have promoted the unanimous recommendation of corrosion authorities that some form of shielding be given serious consideration. Most authorities recommend shielding whenever a coating is used.

Soil stress damage of one type or another may occur in any type of soil. The displacement type is of more common occurrence than distortion. The latter is confined to soils which tend to vary considerable in volume with changes in moisture content. Clay, clay loams, bogs, upper layers of swamps, etc. are the most common types of soils in which the major damage from distortion occurs.

Considerable decrease in the moisture content of a soil must take place before the physical movement, often evident through cracks appearing in the soil, is sufficient to cause a corresponding change in position of the coating. Various tests have indicated that a 50% decrease in moisture content is necessary to produce a soil contraction sufficient to cause coating distortion of a degree that will expose the metal. The soil must be closely compacted around the pipe to produce distortion. Such compactness may be caused by flooding trenches in which instance a high saturation is also produced and there is more likelihood of a high percentage decrease in moisture content. Distortion seldom occurs on distribution systems as the ground surface is often a semi or fully impervious material which minimizes the percentage change in moisture content.

Distortion may be caused by trench settlement particularly when the original fill is loose around the pipe or the trench has been dug to an excessive depth. As the fill moves past the pipe in settling it may cause coating to pull away from the pipe.

Heat is of much smaller relative importance on buried lines in causing coating distortion. However on exposed lines or in a few remote instances of lines buried in soils exposed to high temperatures (120-140 degrees F. would be extremely high temperatures for ordinary coatings of the enamel or grease types unless especially prepared), an appearance of distortion may be produced by the fluidity of the material at such temperatures causing it to flow by the force of gravity alone.

A general description of the cause of distortion is any action which tends to require a portion or all of coating to resist tension or shear. Displacement results from a coating being placed under compression.

The plastic or viscous properties of a coating material are thus a factor in soil stress. The usual method of judging resistance to soil stress is by the apparent hardness. The sense of feeling may indicate that the coating is hard. The sensation of hardness produced by feeling or a numerical value produced by test is based upon a mometary recording of some action. An important requirement of a protection is resistance to long sustained tensile, shear or compressive forces of even small intensity. An example of the small intensity required to displace an enamel coating occurred during development tests in 1926. A piece of unshielded coated pipe was hung horizontally in a room subjected to atmospheric summer temperatures but not exposed to direct sunlight. A 3½″ x 5″ cardboard tag containing test data was attached to the 2″ pipe by a string tied at the top but loose at the pipe bottom. In the course of four months the string had completely penetrated the 3/64″ thick coating which had a ring and ball test melting point of 160 degrees F. More recent experiments of this nature on the same manufacturer's coating having the same melting point but changed in other respects indicate a higher resistance to displacement although not sufficient to warrant use without shielding wherever soil stress occurs.

There are other causes than the stresses due directly to soil action which produce patterns on coatings similar to soil stress. Exposure to the sun has been mentioned. Atmospheric temperatures may produce the same result as sun even though the pipe may be protected from direct exposure to the sun only the time interval is greater. The weight of the pipe concentrated on comparativly small areas such as on straps which suspended the pipe on another structure, supports or blocking, areas of support in unleveled trenches, other structures, etc., produces distortion. Uniform bearing of the coating against soil minimizes such damage. When it is necessary to fasten pipe to other structures by

straps, brackets or other means the removal of any previously applied coating before erection and field coating the attachment with the pipe will minimize the possibility of defective protection.

Practically all types of coating are distortionable. A general reason for the distortionable characteristic in the apparently hard coatings is that such materials are usually mixtures, not compounds. The use of fillers is the most common method employed to add resistance to the tendency to flow under pressure. Distilling procedure, character of raw material, use of cut backs, etc. have an effect on the apparent hardness. However, the more fluid ingredients continue to exist in the mixture in the state they were previous to compounding except for such slight changes as may occur from heating during application. Therefore, while the hard fillers remain intact they float in the softer mediums and the dynamic force exerted gradually causes the mass to shift.

Roots may exert considerable pressure by traveling as hair roots through minute spaces at the coating surface and then enlarging in cross section. Such action may occur from certain grass or bush as well as tree roots. The root appears to gradually depress the coating and complete penetration depends upon the final size of the root. Roots have been frequently observed which forced a path through the coating and reappeared some distance from the point of entry instead of following the surface of the coating. Roots tunnelling enamels for more than 2 feet before reappearance have been found. As the root swelled in size the coating generally became thinner but continued to conceal the root.

The dead weight of the material above a coated pipe or any imposed load may add to soil stresses in producing distortion or displacement. The fact that soil stress causes equal damage to coatings on all sides of the pipe when the pipe is uniformly in contact with the soil makes it difficult to ascertain the exact contribution of dead weight to the damage. Failure of coatings from soil stress has occurred on small diameter pipe when the pipe top was at the ground surface. The soil was a coarse sand with a small amount of loam. There has been some indication that soil stress damage decreases with increased depth of burial, especially below four feet but as such a conclusion is based only on a limited visual inspection it is included as a suggestion for further determination rather than fact.

The freezing of the soil surrounding coated pipe does not appear to contribute materially to damage from soil stress for several reasons. In northern latitudes pipe buried after the thawing of the soil and examined previous to the next freezing period was found to have been considerably affected by soil stress. Pipe buried in the same type of soil beneath the frost line has been found affected to the same extent as that within the frost line. Soil stress has produced extensive damage to unshielded lines in areas where no frost occurs. These conclusions are based on numerous visual inspections by separate investigators. Research on the causes of soil stress and the relative intensities of each cause would materially assist in the development of corrosion protection.

The distortion or displacement of coating on the bottom and top of pipe provides an opportunity to study how mains are actually supported in a trench and how effective backfill methods are in compacting the soil. The observation of the sides has also provided some ideas on the transverse movement of pipe.

There are appearances produced during application of a coating which are similar to although usually distinguishable from those caused by soil stress. Pits caused by bubbles bursting during application are more uniform both in size and quantity than designs caused by displacement. Frequently in bursting a very thin layer of enamel projects out from the edges of the crater toward the center. The interior of bubbles are ordinarily smoother than the crater of a pit caused by soil stress. In softer coatings what was originally a bubble may become distorted or deepened by soil stress in which instances soil stress is unintentionally designated as the sole cause. A wavy appearance may be caused by the running down of hot onto cooled coating, lapping over successive pours of the coating and other reasons producing an observable variation in thickness. The smoothness and uniformity of location and design

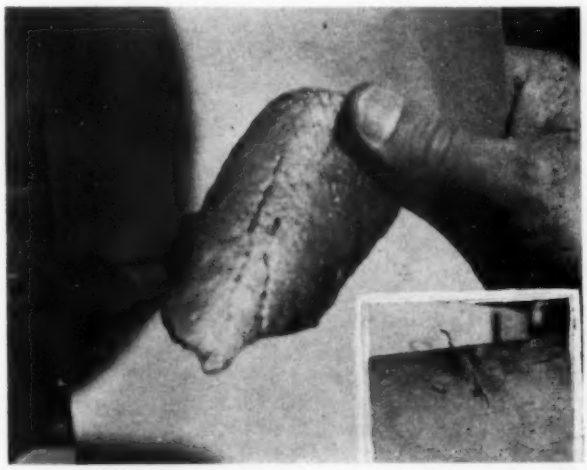


Fig. 4—Soil stress effect of roots. Enamel removed from pipe. Dark points are where enamel was penetrated after 10 months' burial. Insert shows a root entering enamel and exiting after more than 2" of tunnelling.

of coating appearances resembling those caused by soil stress are usually distinguishing characteristics. Experience rapidly develops the ability to distinguish the causes.

Thin coatings are as susceptible to soil stress damage as thicker ones although the reason for the failure is more difficult to ascertain from observation. Coatings which remain in a state of viscosity similar to greases are readily displaced by soil stress.

Ductility and Brittleness

A corrosion protection material must possess ductility and lack extreme brittleness. A pipe cannot be installed exactly as it lay when the coating was applied and if it could variations in settlement would cause transverse or longitudinal bending or a combination of both after installation. Ductility is required to minimize damage during transportation, connecting separate lengths and laying in the trench bottom more than subsequently. Small diameter pipes are flexible longitudinally while pipe above 3′ or 4′ in diameter is more flexible transversely. The transverse flexing of large diameter pipe is more common in the water than other industries.

Hardness is advantageous in resisting soil stress but the added embrittlement would increase the damage from blows. A balance between the two has been established by experience. The ductility of coatings may be determined by bending tests or evaluated indirectly by the melting point of the material. The brittleness of hard surfaced coatings is determined by the drop ball or shatter test. These latter type coatings may be sufficiently ductile to allow bending of a pipe length a few

inches but readily spall off if the arc of bending is increased or a slight tap is struck where the coating is under internal stress. Coatings should be required to possess a ductility sufficient to bend as much as the pipe on which they are placed can bend without force being applied.

An interesting feature of some coatings is that after being stretched so that an internal stress results they gradually flow until the stress is relieved or neutralized. A phase of this characteristic worth noting because of its occasional use as a sales argument by manufacturers

Fig. 5—Displacement of unshielded enamel following too long a period of exposure to the sun before installation. Excessive displacement from soil stress is similar in appearance.

is self-healing. A coating may be stretched by bending or other methods until a slight crack develops. Under the pressure and temperature conditions existent in the ground some claim their product possessing self healing ability will gradually seal the crack and become an integral mass. Proof of this is not lacking but relying upon its success would be doubtful practice.

Coatings should not be condemned for brittleness as the economy of some such coatings would be beyond doubt if a strong bond and continuity could be cheaply produced. For instance a glass coating would provide exceptional protection for an indefinite period. Glass would be one of the few coatings which occurs in nature in the same form as used and therefore would have no tendency to revert to the original compound. Scientific advancement in the art of glass application may well span present difficulties.

Heat

The requirements of a coating must include resistance to the various types of destruction which may be caused by the temperatures to which it will be subjected. Disintegration of the coatings should not occur at any temperature to which it would be subjected in application, installation or use. The temperature to which some compounds must be raised for proper application may produce a form of disintegration which is separation of the compound into its component parts. Recognition of this possibility is vitally important in application as some means of avoiding disintegration must be used. The importance of uniformity in the coating material applied warrants a study of the particular material so that automatic mechanical means of its maintenance are available or the proper skill is applied to return ingredients lost through heating.

Heat may cause the coating material to lose its more volatile ingredients. Such loss may increase the rapidity of disintegration. The addition of fluxes or cut backs to compensate for losses may change the characteristics of the material.

The effect of heat or lack of heat is easily determined by laboratory tests but the comparatively short duration of these tests limit the value. The laboratory test on the effect of high temperatures should be prolonged a period comparable to any which may be sustained during application or installation.

An important consideration is the effect of heat during storage. A heat that would have no effect during a few hours may cause damage from sagging when the pipe is exposed to direct sun rays repeatedly for a week or more. Even when coating is shielded with a heat insulating material the pipe will attain a temperature in excess of the maximum atmospheric temperature. The maximum atmospheric temperature recorded at any location cannot therefore be used as a criteria of the critical flow point temperature of pipe coating. All heat effects must include the element of time.

Flow Point

It is thus necessary to consider a flow point of coating in addition to the hitherto mentioned melting point. The flow point is that temperature at which gravity alone will cause the coating to "sag" or flow downward if not confined. Time is an important element as a heat sustained for several hours may produce more sagging than one of higher value but only momentarily applied. The determination of the temperature at which a coating

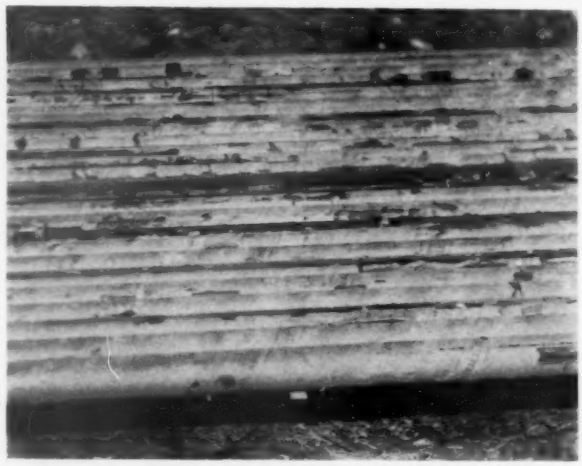


Fig. 6—Appearance of mill wrapped protection after outside storage during an unusually severe winter when temperatures were 15 to 20°F. below zero on several occasions. Damage was confined entirely to Kraft paper and outer layer of enamel. The corrosion protection value of the coating was found by tests to be equivalent to newly protected pipe.

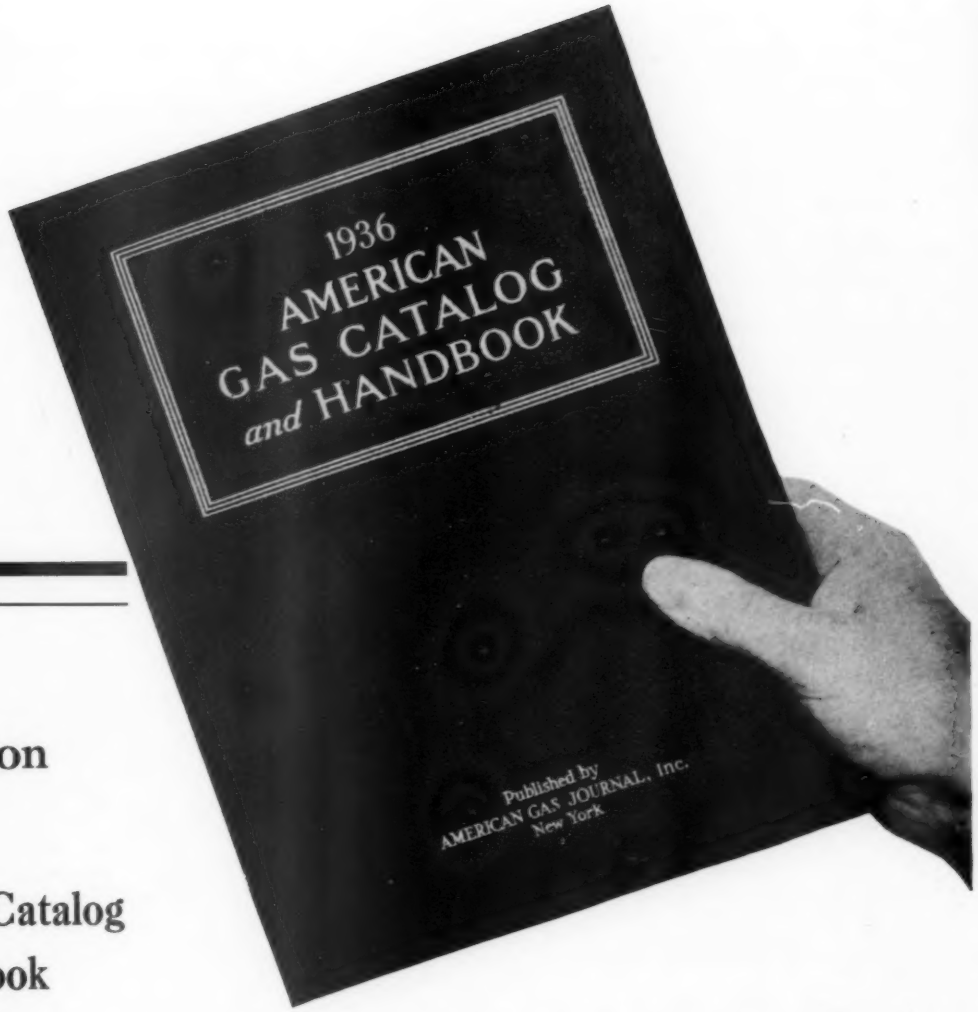
is to be tested for flow and the period of exposure should be based on the practical conditions encountered. The determination of the flow point when it is above actual conditions is a matter of interest but of little importance at present when comparing coatings with other users.

The effect of heat and pressure may be important because of storage conditions and may be easily duplicated in laboratory tests. The injection of pressure would not exactly duplicate soil stress action as the flow point is considered from a temperature rather than pressure viewpoint. In storage the pressure is usually distributed over a comparatively large area considering soil stress.

Freezing

Pipe laying must proceed in freezing as well as warm weather. The most extreme conditions of both low temperatures and sudden drops in temperatures are en-

(Continued on page 88)



The 1937 Edition

of the

American Gas Catalog and Handbook

will be issued in December

The data pages in the 1936 Edition will be revised and a large number of new charts and tables will be added.

Its data pages will contain material of great reference value to every man responsible for the operation of every department of the Gas Industry.

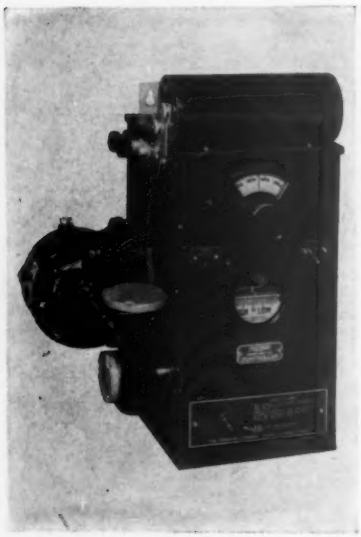
Every subscriber to American Gas Journal automatically receives his copy of the Handbook on publication.

Manufacturers of equipment and appliances who advertise in the Handbook, keep their products constantly before the men who buy and recommend every item used in the production, distribution and utilization of gas.

New Equipment

Throttling Controller

A new Throttling Potentiometer Controller, designed to provide close temperature regulation for heat-treating furnaces and similar applications, is offered by The Foxboro Company, Foxboro, Mass. The electrically-operated control system regulates the position of a throttling valve to maintain the flow of fuel required to hold the temperature constant within the throttling range. Thus, abrupt changes in fuel supply are avoided and the temperature remains constant within a narrow control zone.

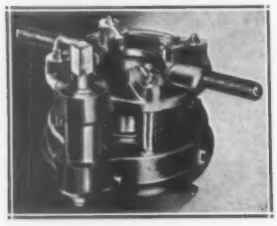


Operation of the unit, based on the familiar potentiometer pyrometer circuit, uses a second slide wire in the control circuit for smooth operation. When the galvanometer pointer contact unbalances the bridge on a change of temperature, a sensitive relay detects the current flow and causes a corresponding readjustment of the motor operated valve, at the same time adjusting the slide wire contact to rebalance the bridge circuit. The change in the valve adjustment for a given deflection of the instrument may be as great or small as desired.

This unit is claimed to be particularly suitable for precise regulation of furnaces operating under fairly uniform conditions of loading, fuel pressure, B.t.u. value and the like, where a definite furnace temperature may be expected for each position of valve opening.

Taper Post Threader

Beaver Pipe Tools, Inc. of Warren, Ohio, describe in a recent bulletin their No. 48R pipe threader for 2½" to 4" pipe. Features

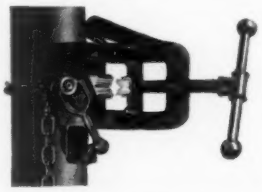


are extra wide die, fully enclosed gears and is semi-adjustable for cutting oversize or undersize. For right hand tapered threads only.

New Post Vises

Vises which can be tightly locked to any column, pillar or post up to 10" in diameter are now available for use on the job, where piping is to be done.

A snap of the chain, a



turn of the locking handle and the Post Vise is set on post or column. A frictionless cup takes up all the slack to make locking and releasing of chain easy.

This vise has broad jaws, which, along their entire surface, grip the pipe tightly without digging or marring. A four-point slide bearing insures easy adjustment.

The new series consists of two types, which holds pipe from ⅛ to 2"; and from ⅛" to 2½". Both models are equipped with ¾" Pipe Bender. Made by The Armstrong Manufacturing Co., Bridgeport, Conn.

Angle Flow Valve

The Minneapolis-Honeywell Regulator Company Angle Flow Valve rounds out its line of controls for improving circulation on hot water heating systems. This newcomer to the Minneapolis-Honeywell line it is claimed will reduce control and installation costs for hot water heating systems since an Anglo Flow Valve acts both as a flow valve and elbow at the same time. The new valve has several definite improvements over those heretofore produced. It embodies a new valve disc construction that balances the pressure head to assure against leakage from gravity circulation. Larger sizes of these valves are included with flanged ends in order to facilitate rapid installation and replacement. The material of the valve body is brass for the 1" size and cast iron for the 1½" and 2" sizes with brass trim for all sizes.

and Appliances

Photo from Cooking School Film

Barber Conversion Burner

"If you dig deep enough, you'll strike gas" is the title of a folder for consumer use issued by The Barber Gas Burner Co. of Cleveland. Featuring the theme of automatic gas heat through the use of present boiler equipment it briefly describes the new Barber Conversion Burner for round or

square type central heating plants. The Barber jet combustion principle of the burner is shown in detail.

Application of the burner to round type furnace is shown in the adjoining cut.

Robertshaw Oven Heat Controls

Bring sight and action for Gas Range selling

Outstanding among the improvements in oven-heat controls are the visual action and accessible adjustment features of the Robertshaw Thermal Eye* Models, made by Robertshaw Thermostat Co., Youngswood, Pa.

The action of the heat control in operation is made visual by the Thermal Eye* that signals when the oven has reached the proper temperature as called for by the dial setting. The Thermal Eye* is a window directly over the thermostat dial with a clear glass center. When the oven reaches the dialed temperature a white signal moves into view indicating that the oven is ready for the food. This action also provides a visual demonstration for sales floors. When the dial is rotated to the low point, room temperature, the red signal moves into view.

This new design is important from a service standpoint because adjustments can be made when installing or servicing gas ranges without disassembling the cooking top. In this design the independent pilot and oven burner by-pass adjustment screws are readily accessible by removing two spring plugs. The adjusting screws can then be reached by inserting a screw driver in the holes provided in the bezel on the manifold panel.

Model AT control with integral oven gas cock, Thermal Eye* Oven burner by-pass and independent pilot adjustment is shown. Other models for every price or service need are also available. Action photo from Robertshaw Cooking School film is shown.

* *Reg. U.S. Pat. Off.*

Daynite Timercoid

For day and night automatic temperature regulation in houses equipped with automatic heat a compact electric clock is marketed under the name of the "Timercoid." It operates on a 60 cycle 24 volt current using a 24 volt transformer.

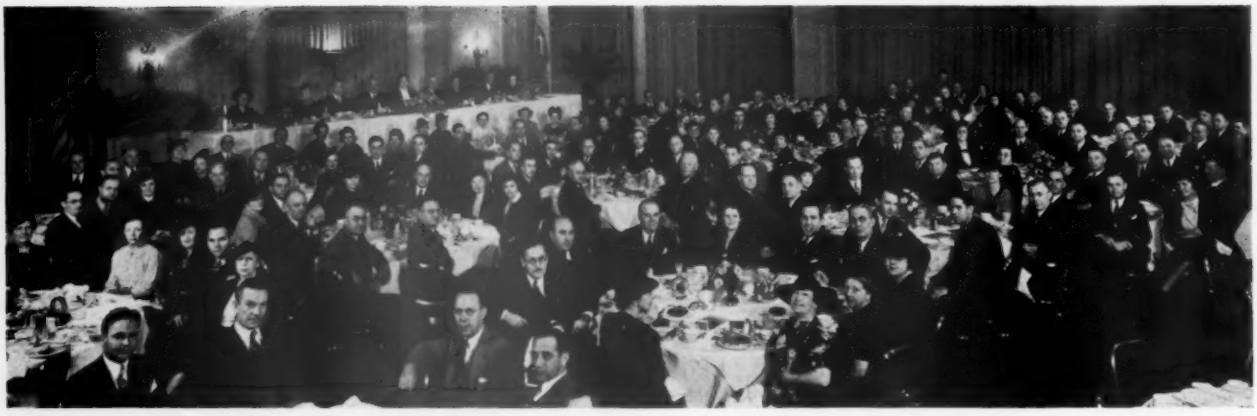
Two 24-hour dials are provided —one to each side. The day hour, and night hour calibrations are plainly indicated by dark and light separations on the dials.

The simple buttons on the front of the instrument respectively facilitate the correct time setting and the required "high" or "low" setting.

The lower button setting is an important feature on this control. If the occupants are leaving for a day or more, the button may be set to the calibration marked "Lo", in which case the heating equipment will operate continuously on the low setting until changed. If it is desired (as in the case of sickness) to maintain a day temperature setting at night, the button is turned to the "Hi" calibration. For

normal day and night operation, the button is turned to the "Auto" calibration—a simple and positive adjustment meeting every requirement.

Manufactured by The Mercoid Corporation, 4201 Belmont Ave., Chicago, Ill.



The Home Service Breakfast during the A.G.A. Convention at Hotel Statler, September 29th.

Home Service Breakfast

by

Jessie McQueen

Home Service Counsellor
American Gas Association
420 Lexington Ave., N. Y. C.

WE engaged the hotel ballroom for the Home Service Breakfast at the AG.A. Convention in Cleveland this year, and it wasn't a bad idea as we had 186 in attendance. Each year this Breakfast has increased in numbers and interest, and our aim,—that of greater executive attendance to hear the home service story, has been gained. Seventy per cent of the number were sales managers and other executives, all with the sincere interest in knowing "just what makes the wheels go 'round" in home service work.

Elizabeth Sweeney, Chairman of the Home Service Committee and director of home service in the New York State Electric & Gas Corp., presided as Chairman, and after outlining the work of the Committee as given in the Home Service Committee Report of the Commercial Section, she announced a special accomplishment in the preparation of a booklet on equipment for school laboratories entitled "Modern Kitchens for Homemaking Instruction",—this booklet available from the American Gas Association.

Greetings were extended to the group by Association executives: Herman Russell, President; Alexander Forward, Managing Director; and F. M. Banks, Chairman of the Commercial Section. Each indicated his pleasure at the growth of home service work and the particular interest in the Convention Breakfast. F. M. Banks, as a suggestion for future work, hoped that home service would pay more attention to instruction for company employees so that everyone in the organization, whether in the sales department or not, might be company salesmen.

Five home service directors participated in the popular feature of two-minute talks on current home service activities. They included Margaret Nevins, The Syracuse Lighting Company, Inc., describing home service participation in the housing development of that company in their Five Star Home Program; Mrs. Eleanor Kingsley, Worcester Gas Light Company, Framingham, Mass., as Chairman of the home service group of the New England Gas Association outlined their particular sales programs in the home service study work this year; Hulda Ungericht, The Ohio Fuel Gas Co., Columbus, Ohio, as director of home service activities over a large part of Ohio described the 1938 program of the Gasco Cooking Schools,—these schools carried around to all towns through the properties; Mildred Bailey of the Public Service Electric & Gas Co., Newark, New Jersey, had the interesting assignment "Home Service in National Advertising," and her paper listed ways in which this cooperation is being carried on in a great many home service departments throughout the country; and Mildred Clark, Oklahoma Natural Gas Company, Tulsa, Okla., inspired the group with the statement that home service can make home cooking pay, and justified the so-called decorative demonstrations by proving that to teach women how to prepare food attractively in the home was one of the ways of interesting them in more home cooking.

One of the popular features of the Home Service Breakfast program is that of the individual introductions. It was feared that as the group grew larger this tradition might have to be given up. It met with protest from home service directors and executives alike, and so the introduction responsibility fell back as usual on the Home Service Counsellor. These introductions make it possible for people to know each other. The home service directors were impressed with the executive attendance, and the executives were interested to know which companies had home service representatives present. Many of our guests this year included editors from the leading women's magazines, and it was a pleasure to welcome them in these introductions.

Miss Sweeney, in closing the Breakfast program, introduced the incoming Chairman of the Commercial Section, H. H. Cuthrell of The Brooklyn Union Gas Company, Brooklyn, N. Y., and the incoming Chairman of the Home Service Committee, Mildred Clark of Tulsa.

News of the Industry

National Bottled Gas Association Meeting

The September meeting of the National Bottled Gas Association was held in the Hotel Cleveland on September 28th.

In the opening address, A. B. Cameron of the Phillips Petroleum Co. called attention to the necessity for replacement sales of modern ranges to hold the present user and to introduce bottled gas. He felt that the industry should educate users to take full advantage of range improvements including low temperature oven cooking.

Speaking of the results of a seven weeks' campaign in one community he said this was predicated on a 36 month finance period with a $36 trade-in allowance on the old range for a new one with a sale price of $137. The campaign was well fortified with publicity, and demonstrations, and prizes were offered to stimulate sales. The electric range, he felt, was the chief competitor of bottled gas.

Col. G. A. Burrell of the Atlantic States Gas Co. stated in his address that between 350 and 400 thousand families are served today with bottled gas, while the industry began 30 years ago, it is only during the last 15 years that it has become an industry of consequence having had a considerable upturn during the past two years.

He sketched an outline of the birth and growth of the bottled gas industry and pointed out that the price trend in service cost is downward, also that 75% or more of bottled gas customers have gas ranges only. He urged the selection of ranges with all modern accessories. He predicted within the next few years a very rapid increase in the business.

The paper prepared by F. L. Kohler of Southern Protane Service, Washington, D. C., on "Government aided competition vs. Unity" was read by T. J. Strickler of Kansas City in the absence of the author, who pointed out that on the farm only 7.9% of the homes use electric ranges—indicating a large and wide open field for bottled gas and the gas range.

J. D. Creveling, President The Panhandle Eastern Pipe Line Co. of New York seems to be reaching into his pocket for a rabbit's foot he will hand to Charles A. Harrison, Asst. General Manager of Toledo Edison Co. who appears in a receptive mood. (Photo courtesy, American Gas Association)

Close-ups taken at the American Gas Association Convention in Cleveland Sept. 27-30, 1937.

"Bill" Ehlers with Reynolds Regulator

The appointment of William A. Ehlers as their Eastern Factory Representative has been announced by the Reynolds Gas Regulator Company of Anderson, Indiana.

Active in Gas Engineering and sales relations for the past 25 years, Mr. Ehlers has had wide experience in the gas industry. As Sales Staff Manager of the Public Utility Department, Johns-Manville Corporation, New York City, Mr. Ehlers spent nine years in directing the sales of their products in the public utility field in the United States and Canada. He was Industrial Fuel Engineer with the American Gas Association for a period of six years, in which capacity he rendered field service to a large number of member agencies. For two years he was manager of the Industrial Gas Department of the Consolidated Gas Electric Light & Power Company of Baltimore.

Graduated with Tau Beta Phi honors from Lehigh University, Bethlehem, Pa., as a mechanical engineer, Mr. Ehlers entered the employ of Bartlett Hayward Company of Baltimore, obtaining a wide experience in gas manufacture and distribution. Later he was Gas Engineer at the Bureau of Standards, U. S. Department of Commerce, Washington, D. C. During the World War, Mr. Ehlers was resident construction manager for the Koppers Company at New York and New Orleans, La.

Mr. Ehlers has been given charge of the Middle Atlantic territory for Reynolds, which covers the area from New York to South Carolina inclusive. His address is 49 South Clinton Street, East Orange, New Jersey.

Armed with camera and flash bulbs the A.G.A. head-hunter snapped these among the many captured during the sessions. Above, President Russell presents George Wehrle of Denver with the Charles A. Munroe Award.

At the left, Dean A. Strickland of Houston is presenting his address before the Commercial Section on "Stimulating Dealers' Activities." At the right George E. Welker, Chairman Natural Gas Dept. of A.G.A. in opening the Natural Gas Session says "The real watchword of future progress in the industry should be constructive conservation."

Photos courtesy, American Gas Association

Between sessions President Russell tells some amusing anecdotes; this one in particular seems to amuse Major Forward not a little.

Rochester Chorus at A.G.A. Convention

During the general session held on the evening of September 29 at the Hotel Statler a fine program of classic and popular selections was rendered by the Rochester Gas & Electric Male Chorus under the direction of Frank M. Houston.

This well balanced chorus of 32 has been organized for five years and gives many concerts every season. Repeated encores were called for following the program numbers. The final encore, words by Arthur Kelly and sung to the music of "Stout Hearted Men" by Romberg, was received with acclaim.

Give us some men, who are gas-minded men
Who will fight for the sales that we need,
Gas-minded men are the right kind of men
To maintain our new pace setting speed!
Oh! Bigger and better, each one a go-getter,
They'll grow as they make people heed,
For there's nothing in the world can halt us or dismay
When gas-minded men together work for A.G.A.

Bassos in the foreground, the Rochester Gas & Electric Male Chorus makes a big hit with their topical song "Gas Minded Men".

(Photo courtesy, American Gas Association)

CONVENTION CALENDAR

October

American Society for Metals—1937 Congress and Exposition, Atlantic City Auditorium, Atlantic City, N. J., October 18-21.

Mid-Continent Oil & Gas Association of Texas—Dallas, Texas, October 29-30.

National Bureau of Standards—Conference on Corrosion and Protection of Pipe Lines, National Bureau of Standards, Washington, D. C., Nov. 15-17.

February, 1938

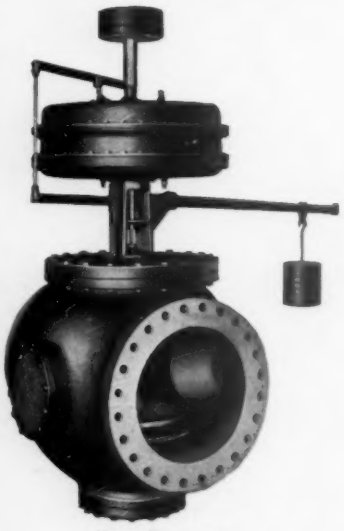
New England Gas Association—Hotel Statler, Boston, Mass., Feb. 25-25.

F. T. Carpenter Joins Philgas

Philgas Department of Phillips Petroleum Company, marketers of liquefied petroleum gases for domestic, industrial, gas manufacturing, and sundry uses, announces the recent addition to its Detroit Office staff of Mr. F. T. Carpenter, a well-known figure in the gas industry.

Mr. Carpenter, a graduate of Drake University in 1921, had his early training in the gas business under his father, a Superintendent of a manufactured gas plant in Iowa. For many years Mr. Carpenter was associated with the American Gas Construction Company and its successor, the C. I. Tenney Engineering Company, as Superintendent of Construction. While with this organization, Mr. Carpenter was in charge of building many water gas, natural gas, and liquefied petroleum gas plants and distribution systems all over the United States.

PRODUCTS OF FORTY YEARS' EXPERIENCE--



Low Pressure

Irrespective of the service or pressure there is a "Fulton" Regulator to meet each requirement. Illustrated are the Duplex Sensitive Gas Governor and the Toggled Reducing Regulator.

Catalogue, mailed on request, giving details of all types.

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THE CHAPLIN-FULTON MANUFACTURING CO.

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Empire State Gas and Electric Association

One hundred and fifty executives, junior executives and department heads of the various gas and electric companies of New York State met for the thirty-second annual convention of the Empire State Gas and Electric Association at Saranac Inn, on September 16th and 17th.

Joseph P. Haftenkamp, who a few days before at a meeting of the Executive Committee, had been elected President, presided at the second session with Ernest R. Acker, Retiring President, presiding at the first session.

A splendid schedule of talks and papers covering problems of management, taxes, labor relations and various other pertinent subjects, was presented.

Herman Russell, President of the American Gas Association, spoke on the importance of close cooperation between gas and electric interests for the common good of customers and companies.

Mrs. Kenneth Norton, member of the Board of the Westchester Lighting Company, gave a splendid presentation of the women's place in the utility industry and outlined the many opportunities afforded the companies in a more skillful use of the many talents which women possess and can gainfully use.

Dr. Daniel Starch, member of the Board of the Associated Gas and Electric Company, spoke on the Gas Industry and outlined the opportunities ahead for a great industry. He pointed out, with examples supported by carefully derived figures, the success some of the companies with which he was connected had in materially increasing their business and net revenues by a plan of sales analysis, and then action.

E. F. Jeffe, Vice President of the Consolidated Edison Co. of N. Y., Inc., spoke on Power Competition with special reference to individual plants. A most enlightening exposition of the unfairness of this form of competition was given. He outlined the plans being used by his company for meeting this form of competition which in the recent past has been highly successful.

A. H. Kehoe, Vice President of the Edison Electric Institute and Vice President of the Consolidated Edison Company of N. Y., Inc., delivered a most interesting message for the Institute. A splendid resume of the progress of the electric industry was outlined.

Edward R. Eastman, Editor of The American Agriculturist, spoke on the value of electric service to the farm population. He made an urgent plea for the continuance of the present cooperative relationship between farmers, colleges and utility companies.

Reverend J. P. Boland, Chairman of the New York State Labor Relations Board, spoke on Fundamental Labor Relations, in which he stated as a fundamental truth that labor relations are human relations.

Hon. Mark Graves, President of the New York State Tax Commission, spoke on Utility Taxation and in a most enlightening and interesting manner told of the distribution of the tax load with some pertinent suggestions as to a more equitable distribution.

The new officers of the Association, elected at the Executive Committee meeting on September 9th are:

President—J. P. Haftenkamp, Vice President, Rochester Gas & Electric Corp. Vice President—E. P. Prezzano, President, Westchester Lighting Co. Treasurer—H. C. Davidson, Secretary, Consolidated Edison Co. of N. Y., Inc.

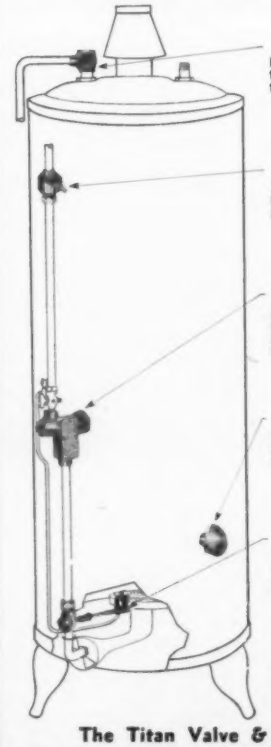
New Minneapolis-Honeywell Offices

The Boston branch office of the Minneapolis-Honeywell Regulator Company has moved to 797 Beacon Street where the entire second floor of the building was taken.

Location moves in both Pittsburgh and Indianapolis were also made to increase operating space. An open house was held August 6th in Pittsburgh to acquaint the industry with Minneapolis-Honeywell's improved facilities at 26th and Sarah Streets. The new Indianapolis district office at 1134 North Pennsylvania Street has been increased to include separate quarters for general, engineering, service and safes offices as well as for display rooms.

These new offices are equipped to supervise, adjust and service Minneapolis-Honeywell instruments or those manufactured by its Brown Instrument Division or the National Regulator Division.

For Perfect Control Specify Titan



Titan Relief Valve
Prevents excessive pressure and temperature. Pressure relief at 150 pounds, temperature relief at 200° F.

Titan Safetystat
Automatically shuts off all gas to the burner in the event excessive temperatures are developed.

Titan Snap Action Thermostat
Is an extremely sensitive instrument providing perfect control of water temperature. Equipped with a Temperature Selector.

Titan Nu-Drain
Its compact design provides almost complete concealment of the body. It improves the appearance of any heater.

Titan Safety Pilot Control
Automatically prevents escape of unburned gas from main burner in case the constant pilot flame should become extinguished.

Titan Controls are built to meet the rigid requirements of water heater manufacturers. Catalog and full details on request.

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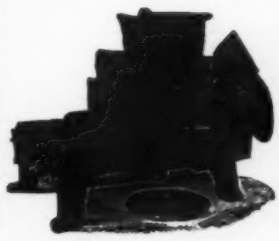
9913 Elk Avenue N.E. Cleveland, Ohio

JOHNSON NO. 118
COMBINATION
BENCH FURNACE



This powerful, many-purpose Bench Furnace is designed for any shop use. Heats largest soldering coppers, branding or stenciling irons. Ideal for tempering, heat-treating, annealing, case-hardening or soft metal melting. No forced air blast required to attain intense uniform heat. Firebox has heavy refractory lining and the patented curved shaped hood forces a return blast of heat over irons or parts being heated. Fired by three powerful Johnson Bunsen Burners. Equipped with removable 22-lb. capacity melting pot. Does outstanding work at a low operating cost. Write for free catalog.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

Dr. Koppers Visits U. S. Affiliates

Dr. Heinrich Koppers, ruddy 64-year-old engineer and industrialist of Essen, Germany, who as a pioneer in the chemistry of coke spurred the worldwide development of the products of coal and coal-tar, and for whom the farflung Koppers interests in the United States are named, returned recently to Pittsburgh for a friendly visit with his former associates and to visit industries in Detroit, Chicago and other cities.

Koppers formed an American branch of his business in 1907 and "spent the next seven years ferrying his slide rule, his excitable vitality and his wide black mustache between his two headquarters in Essen and Chicago." The brilliant German and his staff of associates had built nine coke plants in the United States by the time of the outbreak of the world war.

The American business became so extensive that in 1913, Koppers began negotiations with a group of Pittsburghers for American financing. These negotiations were concluded in 1914 with the organization of the Koppers Company, and the Chicago offices and staff were transferred to Pittsburgh. Koppers, who had decided to return to Germany, disposed of his business and patents to the new company.

The present-day firm of Heinrich Koppers, G. m. b. H., of Essen, founded in 1901, has more than 2,000 employes, owns and operates its own silica refractories at Dusseldorf, and is engaged in a multiplicity of chemical by-product processes. One of the most important projects at the present time is the erection of plants for the synthetic manufacture of motor fuel through the derivation of a gaseous mixture from brown coal briquettes and coke.

In the executive offices of Koppers Company in Pittsburgh hangs an autographed photograph of Heinrich Koppers, a reminder to his former associates of a scientist and engineer who, as they express it, is "dynamic, hard-working and direct, and who goes straight to the heart of a problem with simplicity and breadth of vision."

"West's Gas"—1937 Summer Number

Here is a travelogue in book form that is most interesting and entertaining. Reference to the gas industry and the Company's products seems to have been purposely and studiously avoided. Instead of this the reader of this 96 page volume is carried by picture and text to five separate continents in a series of well written and illustrated descriptions showing nature's wonders through personal travel experiences of sixteen authors of its several chapters. From Hudson Bay and Japan, from Russia and from New Zealand, Burma, South Africa and South America come tales of intense interest and color. The opening chapter deals with the maiden voyage and arrival of the liner *Queen Mary* at New York. The American representative of the Company describes and illustrates his tour of Yellowstone National Park while Sir Frederick J. West modestly offers the closing travel talk with a description of "The Thermal Activities of New Zealand"—its boiling earth and spouting geysers.

All told it makes an engaging afternoon's reading. One is inclined to linger long in admiration of its many vivid illustrations. As an example of the printer's art confined to black and white only, it is a masterpiece of the press.

Copies may be had by addressing West Gas Improvement Co., 424 Madison Ave., New York or West's Gas Improvement Co., Ltd., Manchester, 10, England.

A. I. Wallace Appointed Vice President American Gas Products Corporation

Mr. W. T. Rasch, President of American Gas Products Corporation, has announced the appointment of A. I. Wallace of Chicago to the position of Vice President. Mr. Wallace has been associated with American Gas Products Corporation for the past ten years. His many friends

A. I. WALLACE

both in the East and West will be happy to learn of his promotion. "Spike", as he is affectionately called by his associates and friends in the industry, has had a wealth of experience in gas fired heating equipment and automatic controls. His entry into the gas business dates back thirty years, twenty-five years of that time having been spent in manufacturing gas equipment.

He has a wide acquaintance throughout the industry and will continue to make his headquarters in the AGP Chicago Office.

Detroit Brass Promotes

Detroit Brass & Malleable works announces that Raymond L. O'Brien, former Secretary of the Company and manager of the Gas Range Cock Division is now Executive Vice-President and General Manager.

Gordon H. Wilson, former representative in the Middle West becomes Manager of the Gas Range Cock Division.

Fritz H. Rutherford, formerly in the Eastern territory, is appointed Sales Engineer.

New Hard-Facing Procedure Booklet

The Linde Air Products Company, Unit of Union Carbide and Carbon Corporation, announces the publication of a folder, entitled "Steel Hard-Facing Procedure". It presents detailed instructions for applying the hard-facing material, Haynes Stellite, to steel wearing surfaces.

Copies are available through any office of The Linde Air Products Company.

Three New All-Gas Homes for Chicago

To effectively demonstrate the application of gas for the comforts and conveniences demanded in the modern home today, Peoples Gas Light & Coke Co. is constructing three complete demonstration homes to be opened for inspection in October.

All three homes are of colonial inspiration in design, and are being built in the three main sections of Chicago; one northwest, one west, and one south. Each one has been carefully adapted to the residence neighborhood in which it is being built.

The very latest gas heating equipment will be featured, and will combine with modern gas ranges, Electrolux refrigerators, gas ironers, gas water heaters, and gas incinerators to prove the superiority of gas.

Well known architects were selected to design the homes, and the kitchens are designed by the Gas Co.'s Home Planning Bureau. These kitchens are to be masterpieces of efficiency and beauty. The basements will have ample recreation space with modern, compact, gas heating equipment and laundry appliances.

Herewith a drawing of one of the all-gas modern demonstration homes, now being erected by the Company.

The Downtown Gas Engineers' Luncheon Club at one of their regular monthly meetings on September 13. Though seated, "Hutch" seems to hold the floor for the moment. Standing (left to right) George H. Magee, Long Island Lighting Co.; Oliver S. Hagerman, Atlantic Seaboard Corp'n.; E. J. Murphy, Brooklyn Union Gas Co.; Thomas B. Williams, Utility Management Corp'n; seated, W. P. Hutchinson, Sprague Meter Co.; Alan E. Lockwood, Penn-Western Service Corp'n.; Stephen P. Cobb, Ebasco Services, Inc.; C. Ross Holmes, N. Y. Public Service Commission; Erick Larson, Long Island Lighting Co.

Round Table Discussions

Some years ago a group of gas men initiated what has been known as the monthly informal luncheons of the Downtown Gas Engineers Luncheon Club of New York. It brings together a group of men prominent in the industry for informal discussions on important business and engineering topics relating to the industry. The attendance varies depending on time available to the individuals. Prominent guests of the city and visitors from abroad are invited to attend these luncheons and join in the discussion. The adjoining picture shows a few of the "regulars" who pride themselves on a more or less perfect attendance score. Here doubtless is the birthplace of some of the industry's progressive developments which later are revealed in more complete form through the press and papers presented before the gas associations. Luncheon clubs of this type in many communities would be of benefit to the industry at large.

Gas Furnaces at Metals Show

One of the most interesting and possibly the most dominating feature of this year's National Metal Exposition will be the Combined Industrial Gas Exhibit under the auspices of the Industrial Gas Section of the American Gas Association, in cooperation with a number of gas companies and equipment manufacturers to be held in the Auditorium, Atlantic City, N. J. during the week of Oct. 22.

The Combined Industrial Gas Exhibit will be participated in by 12 manufacturers of Industrial Gas Equipment who will display new and standard metallurgical apparatus for both manufactured and natural gas. Most of these exhibitors will have gas furnaces and burners lighted and going full blast. Many new pieces of equipment, controls, etc., that are destined to play an important part in the metals industries, in the not distant future, will be shown.

The layout of the Gas Exhibit has been prepared by the Committee on Displays at National Industrial Expositions, of the Industrial Gas Section of the American Gas Association, Harry A. Sutton, Public Service Electric & Gas Co., Newark, N. J., Chairman.

Those who will exhibit are: American Gas Furnace Company, Burdett Manufacturing Company, Despatch Oven Company, Eclipse Fuel Engineering Company, Ensign-Reynolds, Inc., Gas Machinery Company, Gehnrich & Gehnrich, Chas. A. Hones, Inc., The C. M. Kemp Mfg. Co., The Partlow Corp., Selas Company, Surface Combustion Corp.

Obituary

Donald McDonald, secretary-treasurer and a director of the American Meter Company, died recently at his home, 993 Park Avenue. He was sixty-eight years old, a native of Albany.

Mr. McDonald started his career as a manufacturer of gas meters in 1886 in the firm of D. McDonald & Co., of Albany, which was founded by his grandfather in 1855. Mr. McDonald became manager of the factory in 1912.

During the World War he was Director of Military Census of Albany County and New York State chairman of the Second Red Cross War Fund. D. McDonald & Co. having become a part of the American Meter Company in 1913, Mr. McDonald came to New York in 1919 as general superintendent of the meter company.

DONALD McDONALD

He became secretary and a director of the company in 1922, and, in 1936, treasurer as well.

Under the N. R. A. Mr. McDonald was chairman of the Gas Apparatus and Accessories Institute, and a member of the governing board of the Gas Appliances Institute. He was on a special committee appointed to form the Association of Gas Appliance and Equipment Manufacturers, of which he acted as treasurer and a member of the executive committee.

BROOKMIRE *presents*

"Investment Management & Portfolio Control"

...a brochure on the Brookmire cyclical plan for Investors

INVESTORS who have the responsibility for the management of investment funds of $100,000 and over are invited to write for this 50-page brochure which discusses the problem of capital growth as it pertains to capital conservation.

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Administrative Economists and Investment Counselors. Founded 1904

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THE GOODMAN STOPPER

The Reliable Shut-Off for Street Mains

Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.

Safety Gas Main Stopper Co.

523 Atlantic Avenue, Brooklyn, New York

Executive Responsibility

(Continued from page 21)

2. Organization for Industrial Relations

The administration of the labor policy should be centralized and responsibility for the supervision of employee relationships assigned to a staff officer of major executive ability responsible to the chief executive of the company.

3. Supervisory Responsibility

The line responsibility of supervisors toward their own personnel is not affected by the industrial relations organization. They should have adequate authority for the execution of this responsibility, and receive training that will assure the proper integration of the various elements of the company's labor policy.

4. Appeal Procedure

Some procedure for the consideration of all questions or grievances should be established of a character which provides channels of appeal to the highest executive of the company for the prevention of injustice to the individual employee.

5. Stabilization

The social obligation and economic value of reducing casual employment and of increasing general employment stability through the application of research, planning and co-ordination, should be recognized.

6. Co-operative Principle

In the formulation and development of the foregoing the principle of consultation with supervisors and employees should be adopted so as to get full benefit from the demonstrated truth that sound industrial relations are best maintained by learning the viewpoint of employees and supervisors before rather than after the announcement of decisions which closely affect their interest.

Of these six points covering the statement of labor policy and the other fundamentals of a complete program of industrial relations, particular emphasis should be placed on the two which have been referred to as "supervisory responsibility" and the "co-operative principle." One of the crying needs in most companies at the moment is improvement in methods of maintaining contacts with the lower supervisory groups and training them in their personnel responsibilities. Too many companies have neglected to keep these people informed of management's attitudes and decisions. These men, like the employees who are immediately under them, are eager for contact and conference with the higher executives and to have fuller knowledge of the management's problems and possible solutions. Apropos of this very thing, it should be pointed out that a great many employees in this country who would have appreciated an opportunity to talk to the boss in the boss's office have been surprised and, I dare say, amused, by the ease and alacrity with which the outside organizer gains admission to the sanctum sanctorum.

It is patent that business management has been at fault in that it has not made its point of view influential in the determination of governmental policy on industrial relations. Too often employers as individuals and in their associations have offered no constructive public program, but have waited until a bill was introduced and then have met it with a broadside of criticism. It is incumbent upon business executives as employers, as citizens and as members of business, civic and national organizations to envisage the industrial relations problems confronting the public authorities, to devise programs and to press them on the governments concerned. Labor organizations do not wait until government makes a proposal—they propose to the government.

Labor knows what it wants—very definitely, and puts forward its precise objectives—the exact number of hours per week, the duties of the employer in collective bargaining, etc. Employers, I think, should stress the need for flexibility in governmental regulations so that each business can make adaptation to its own peculiar situation and all managements may have the necessary freedom to meet the changing conditions of the market, the season and the business cycle.

Certainly the leaders in management must now educate themselves in an understanding of the political and social aspects of our national labor problems. Also, in order that their individual organizations may fit in with the scheme of things, executives must avoid antagonistic attitudes. They must realize that the labor as well as the financial affairs of any company are now pretty much an open book. In developing their practices in the light of these circumstances it is more important than ever before that the executive have a correct understanding of the employee's viewpoint and that he free himself from prejudices and paternalism.

These are management responsibilities—executive responsibilities. To make your assignment still more difficult, may I close with this observation—an observation which I have recently discussed with several people in this field. Some of them have differed with me but after consideration and before many minutes there has been unanimous agreement that in our experience thus far,

The labor policy of any company, whether it be good or bad, is, like the institution itself, the reflection of—the lengthened shadow of—one man, and the administration of that policy depends upon his ability through organization, training and selection to have it understood and functionalized in his company.

If you are the leader of your company, this is your challenge. If not you should see to it that the leader is brought to realize his responsibility in this all-important matter.

Arrangements for this address were made by the Committee on Personnel Practices of the American Gas Association.

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Pipe Corrosion and Coatings

(*Continued from page 76*)

countered in the atmosphere rather than after burial of a pipe. Observation has not disclosed any material damage to protection from frost following burial. The reason appears to be the slow change of temperature allows the coating to adjust itself and gradually relieve the internal stress caused by contraction by the flowing action previously mentioned. Buried coatings have withstood low temperatures which would have caused cracking had the same temperature occurred in the interval of a few days with the pipe above the ground. The soil after bonding itself to the coating also acts as reinforcement and provides the coating with a greater resistance to the contraction stresses. The same character of resistance although of possibly higher degree is provided by bonded shields. The evidence of this fact is clearly indicated by the absence of any cracking of coatings having that tendency when shielded and stored under exactly the same conditions as one having no wrapping. Unshielded coatings which are subject to considerable contraction with lowering of temperatures cannot be stored in open yards.

Freezing temperatures are not always necessary to produce the above results but large differentials may cause cracking. Coatings for use on pipe to be stored and used in warm sections are compounded so as to produce a high flow and melting point. Cracking may occur at temperatures higher than that at which water freezes. Another viewpoint would be to consider that such coatings freeze above 32 degrees F. and any cooling below their freezing point would cause cracking. The flow point of a coating is somewhat analagous to the yield point of steel.

As the temperature of coatings are lowered beneath their flow point ductility decreases and brittleness increases. Compounding of coatings to provide a minimum of damage from low temperatures without lowering the flow or melting points below desirable limits has been entirely a matter of experience. Exact specifications are impractical and requiring too great a spread between the two would necessitate manufacturers including ingredients which may decrease the effectiveness of the material as a corrosion protectant. A knowledge of the temperatures at which brittleness occurs is necessary so that proper instructions may be issued for more careful handling of the pipe during such periods.

The most common method of providing greater resistance to low temperature damage is the addition of fluxes or cut backs to the material. Many manufacturers vary the compounding of the coating with seasons of the year. As such changes are primarily to provide against damage before installation it is more desirable to secure a coating of uniformly high melting and flow characteristics and provide additional care in handling and prevention of exposure. The difficulties are considerably lessened when the pipe is coated and installed within a comparatively short time as then fluxing if necessary may be resorted to without materially decreasing the value of the coating. The development of coatings has been carried to the point where there need be no hesitation in storing a shielded and coated pipe in atmospheres reaching as low as 10-20 degrees F. below zero. Coatings may be secured which can be safely stored in even lower temperatures.

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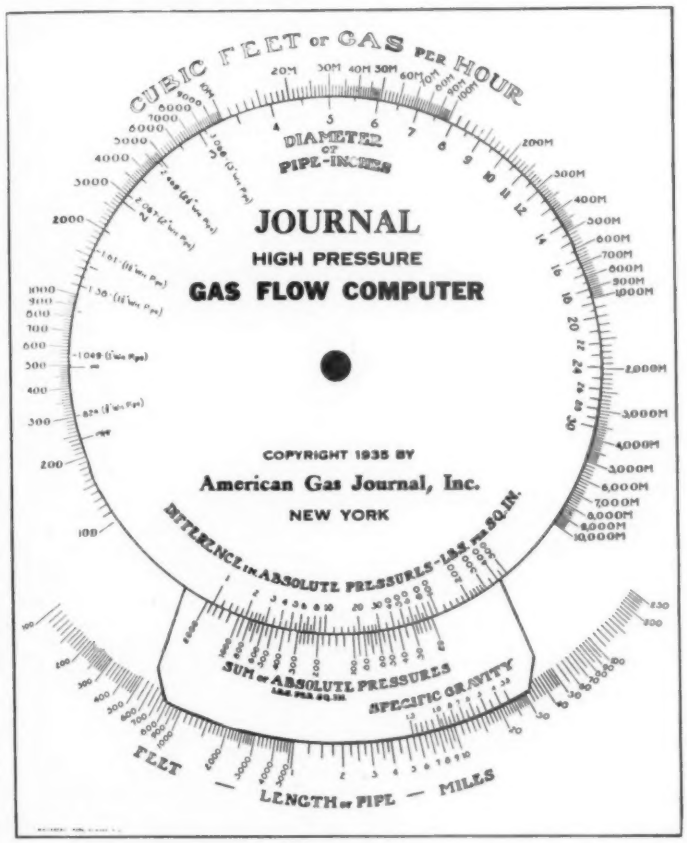

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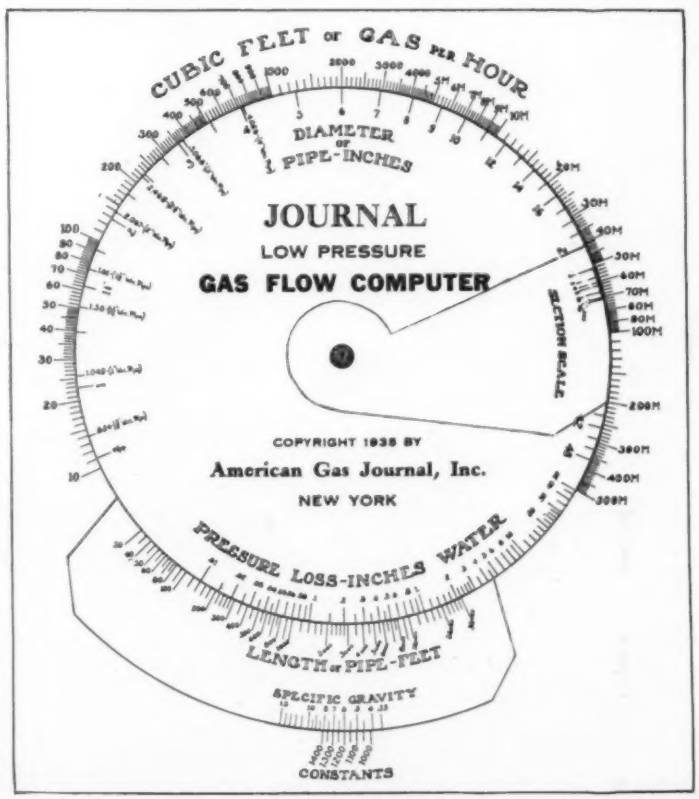

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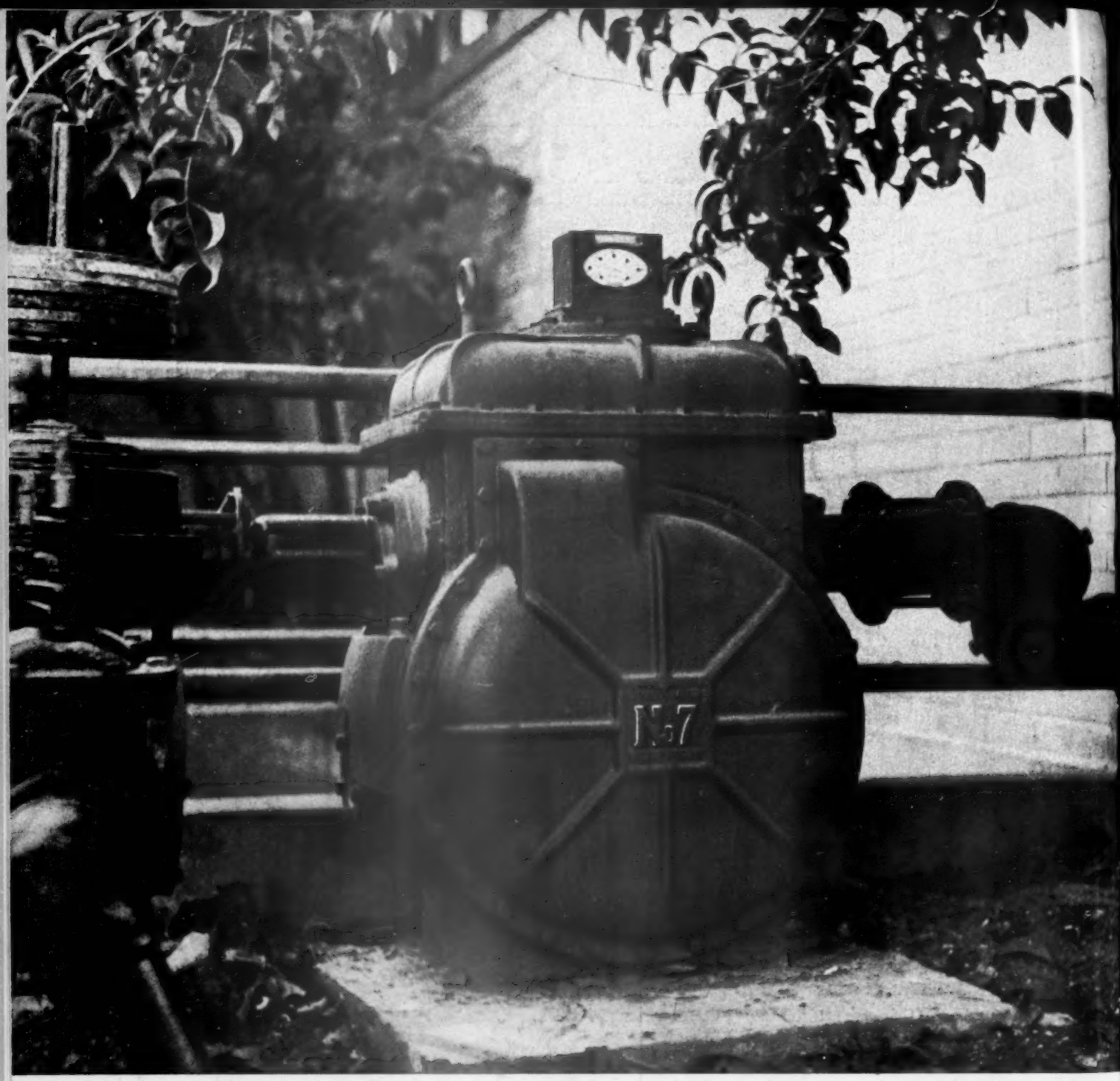

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